ARAB GEOGRAPHY

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ARAB GEOGRAPHY

Being the translation of Section II of M. Reinaud's
Introduction Générale à la Géographie des Orientaux
(Géographie d'Aboulféda, tome i)

S. M. ALI
PROFESSOR OF GEOGRAPHY
UNIVERSITY OF SAUGAR

INSTITUTE OF ISLAMIC STUDIES
MUSLIM UNIVERSITY
ALIGARH

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Sagar
August 12, 1959

S. M. Ali

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FOREWORD

Over a hundred years ago, M. Reinaud published his monumental work on Arab geography, entitled *Geographie d'Aboulfeda*. He was one of the pioneer orientalists, who presented for the first time in a systematic way the Arab geographical literature and thought of the preceding centuries in the first volume of this work, namely *Introduction Generale a la Geographie des Orientaux*. Ever since this celebrated work appeared, it has remained an indispensable guide for the student of Arab geography. Indeed, a number of later distinguished scholars, like M. de Geoje, V. V. Barthold, J. H. Kramers and V. Minorky, have made valuable contributions to the subject and in many respects have surpassed our author. However, Reinaud's survey of Arab geography still occupies an important place in geographical studies, and is indispensable to the student of Arab geography.

It was with a view to presenting this work to a wider section of scholars interested in Islamic civilization in general and to students of historical geography in particular that Dr. S. M. Ali undertook to render a part of it from French into English. He has further augmented the value of the work by adding annotations, comments and explanatory notes on books, authors, place-names, etc., and has crowned the work with a valuable introduction on the history of geography, placing Arab historical geography in its right perspective. In this task, he had the co-operation and assistance of Dr. S. Maqbul Ahmad, who, having read the manuscript, included additional notes and transliterated Arabic and Persian names in accordance with current usage. Further, he prepared

the indices, and has given a select bibliography on the subject. Unavoidable difficulties in the field of printing at Aligarh have, unfortunately, resulted in some deficiencies which are apparent in the book; nevertheless, we hope that this will not diminish its usefulness, and that this work will be welcomed in learned circles.

Aligarh
August 16, 1959

Abdul Aleem

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INTRODUCTION

When viewed historically, geographical concepts are seen to have come from an immense variety of sources. They have sprung partly from activities that cause men to travel over the surface of the earth, i. e. war, commerce, pilgrimage, diplomacy or pleasure. They have also sprung from the accumulated learning and lore of preceding ages and to a small extent from unfettered flights of the imagination. The history of geography, therefore, leads its students into many fields, affording them a key by means of which they may gain a sounder understanding of the extensive ranges of human activity and of the evolution of important phases of intellectual life.

Geography in its widest sense has a complex history. Ancient geography developed independently in at least four centres of the old world, i. e. the Mediterranean Basin, India, China and the valley of the Euphrates and Tigris. The geographical instinct, in one form or the other, is naturally of early development, and these civilizations must have possessed some geographical knowledge or ideas which crystallized in due course of time into geographical principles which laid the foundation of a truly scientific treatment of the surface phenomena of the earth, attendant upon the progress of exploration and cartography and the co ordination of data.

The principal scientific advances in world geography, i. e. the study of the earth as a unit, were dependent on advances in astronomical and mathematical theory and speculation. But lack of factual knowledge did not deter the ancient and medieval philosophers from speculation,

based to some extent on mathematical principles and a passion for symmetry. The sphericity of the earth was indirectly, but correctly proved centuries before the circum-navigation, the existence of certain land-masses (*oecumene*) was postulated long before their discovery, and the mathematical arrangement of parallels of latitude and climatic zones for both the Northern and the Southern hemispheres were established long before navigators disproved the popular conception of the inferno of the Torrid Zone, and opened the way for exploration beyond it. On the other hand the description of countries from the Roman period till the middle of the nineteenth century remained encyclopaedic, with no definite aim, and generally with no principle of scientific description or of correlation and co-ordination of human and physical facts. In the following few pages an attempt is made to illustrate and trace the origins of the most characteristic geographical ideas current in the ancient and early medieval period of world's history. This will serve as a background for the clearer picture of the history of Arab geographical thought in relation to the progress which had already been made in the past in the field of geography and allied sciences.

The natural starting point for the history of geographical knowledge and thought is the Mediterranean Basin, because the peoples that dwelt in the neighbourhood of that sea first cultivated the science of geography on an extended scale, and it was from that quarter that the information was originally derived which furnished material for such a study. The reason for this is to be found as much in the geographical features of that portion of the globe as in the character of the nations that inhabited it. The coasts of the inland seas such as the Persian Gulf, the Red Sea, and the Mediterranean are superior to the Oceans, from which they are inlets, in respect of the variety of their outline. In fact, from that point of view the Mediterranean has the advantage over all the others. By means of this multiplicity of form, communication was promoted between distant

races through the islands which served as stepping stones from one country to another, and the numerous creeks and harbours which provided a place of refuge in bad weather. The conformation of its northern shore is especially noticeable in this respect, and in addition to this, the relative position of the peninsulas of Greece, Italy and Spain, which project into it from the continent of Europe tended still more to facilitate the intercourse between them. Thus the same causes which promoted the civilization of the inhabitants of this region of the globe by enlarging their minds and enabling them to communicate to one another the arts of life, laid at the same time the foundations of a progressive and comprehensive study of geography.

The Phoenicians were one of the first civilized people who acquired information on this subject, but the selfishness of their commercial policy prevented them from imparting to others the knowledge which they themselves possessed, in consequence of which accumulation of facts bearing on geography, and the practice of recording them in such a way as to render them useful to contemporaries and instructive to future generations, was reserved for the Greeks—a people who, both by the versatility of their intellect and the communicativeness of their temperament, were especially qualified to undertake such a task. The first intimations of an acquaintance on the part of that race with distant lands and peoples have been traced in the incidental mention in the Homeric poems of strange sights which were characteristic of other latitudes and of objects of commerce which must have been derived from far countries. After this, when the great outburst of colonising enterprise took place which prevailed during the eighth and the seventh centuries before Christ, the shores of the Aegean, the Propontis and the Euxine towards the east, those of Sicily, Italy, and to some extent of Gaul and Spain to the west and even Egypt and the neighbouring parts of Libya, were revealed to them. Then followed the wars with Persia; and the interest which these excited in that great kingdom

and in the races of which it was composed, stimulated enquiry into the continent of Asia. The information which was obtained from the two sources just named was embodied in the work of Herodotus, and was verified and enlarged by the personal investigation of that writer. Subsequent to this the knowledge of special districts was increased by the expedition of Hanno the Carthaginian along the west coast of Africa and by the retreat of Ten Thousand under Xenophon of Armenia. But the period that witnesses the most advanced geographical knowledge was the latter half of the fourth century before Christ. It was at that time that Alexander carried his victorious arms as far eastward as Bactria and India and explored the shores of the Indian Ocean; while in the opposite direction, Pytheas was investigating the western coasts of Europe and the wonders of the North Sea. The task of enlarging the field of geographical knowledge now passed into the hands of the Romans. The campaigns of Lucullus and Pompey in Armenia and Iberia, the progressive subjugation of Spain, Gaul and Britain, and finally the expedition that was undertaken against Germany and other countries to the northward of the Alps, revealed to view large areas, about which before that time only vague rumours had prevailed. The facts that were thus brought to light were diligently harvested by learned men among the Greeks. The Augustan age formed the culminating point of these discoveries, and it was during that period that the sum of the information which had thus been acquired was once for all brought together, diligently sifted and arranged in a comprehensive form by Strabo.

One can trace side by side with the growth of descriptive geography the gradual development of scientific enquiry regarding the earth and its component elements. In the domain of physical geography the early observation of earthquake movements and volcanic phenomena by the Greeks led up to the speculations of Aristotle on the causes which produced them, and afterwards to the examination and

comparison of them by travellers like Poseidonius. It was through him that the tides of the ocean were made known to the dwellers about the Mediterranean and the cause of their recurrence as explained by Pytheas and other voyagers. In mathematical geography the process of development has been even more apparent. There we notice the early introduction of the gnomon as an instrument of measurement and primitive attempts at map-making and the division of the world into continents.† At the same time the Homeric conception of the Earth as a circular plane, which was still maintained by the Ionian school of philosophers, and was not wholly exploded in Herodotus's time, gave way before the belief in its sphericity, the arguments of which were formally stated by Aristotle. Further advances were made at a later period by means of the measurement of the circumference of the earth, and the computation of the size of the habitable world, by Eratosthenes; and the commencement of a system of parallels and meridians was made by him and Hipparchus. It was reserved for Ptolemy after the lapse of several centuries to complete this, and at the same time the new and scientific system of projection which he invented laid the foundation on which a great part of modern cartography is based.

The two great classical authors in whom the Arabs took the deepest interest were Aristotle and Ptolemy. For centuries Ptolemy's "*Almageste*" and "*Geography*" dominated and guided the geographical works of Arab scholars who, when they receded into the background and thence into oblivion, passed on this brilliant work with comments and criticisms, additions and alterations to the Western world. Ptolemy deserves a special mention here.

†Anaximander (545 B. C.) is supposed to have introduced the use of the gnomon, to have discovered the obliquity of the ecliptic and to have been the first to construct a map. It is also claimed that Hecataeos of Miletos (550-475 B. C.) compiled a book called the "*Circuit of the Earth*". If it is correct—and it probably is — then this work entitles him to be named the 'Father of Geography'.

Claudius Ptolemaeus, mathematician, astronomer and geographer was born in Egypt and worked at Alexandria. The date of his birth and death are not known, but he made a series of astronomical observations from 127 to 151 A. D. and his *Geography* (*Geographike Syntaxis*) is assigned to the period 150-60. Ptolemy developed the concept of Hipparchus that a map should be based upon points of which the latitude and longitude are known. Ptolemy took the results of Marinus, co-ordinated them and after some corrections tried to apply them to the preparation of a map. His *Geography*, which deals mainly with map-making, consists of two introductory books on geography and six others which contain the latitude and longitude of some 8,000 places. It is obvious that in the absence of instruments of precision for measuring bearings, distances or time, depending only on approximations of one or two meridians and parallels, and relying on distances measured as "so many days' march or sail", the determination and fixing of points would be far from satisfactory, and this was all that Ptolemy achieved in this direction. Ptolemy held to the theory of the fixed earth, admitting neither its rotation nor its revolution. He accepted the measurement of its circumference as laid down by Poseidonius—18,000 geographical miles, and also adopted Hipparchus's division of the equator into 360 parts (or degrees). Thus his degree on the equator or meridians was 50 miles (i. e. short by 10 miles). His equator was placed too far north since its position was reckoned from the known northern tropic taken to pass through Aswan. His prime meridian passed through Fortunate Isles which represent the ancient indefinite knowledge of Madeira and the Canaries which were supposed to be 7° more easterly than the real position.

The concept of 'a net-work of parallels and meridians' appears for the first time in Ptolemy's work, and he was most probably the first geographer to apply the principle of 'Projection' to map-making. His attempt

to exactitude in position, under the conditions mentioned above, however, resulted in grave errors. For instance, the alignment of Gibralter, Rhodes, Sicily and Sardinia with 36° parallel is incorrect, resulting in the wholesale maladjustment of the North African coast with respect to the northern and western coast and islands of the Mediterranean. The maps show very incorrect notions of lands away from the northern littoral of Africa, i. e. India, Ceylon and the East Indies, in spite of the fact that information regarding these lands could be available in Ptolemy's time. This information was either neglected or misinterpreted. In the north-west, Ptolemy's information does not go beyond the British Isles.

The early belief in the Ocean surrounding the world was rejected by Ptolemy. He conceived of Asia, in full continental bulk, extending beyond his own meridian of 180°. For Africa he assumed a land connection between south-eastern Africa and south-eastern Asia, so that he viewed the Indian Ocean as an enclosed sea.

The influence of Greek and Roman Geography, good or bad, on the medieval and modern geography has been considerable. It is true that in medieval Christendom little was read of ancient geographical works except probably Pliny and Solinus, and the more solid treatises like Ptolemy's were left over to the scholars of Islam. The Arabic translation of Ptolemy under al-Ma'mún (d. 833) was an event of special importance, in that Ptolemy was studied more carefully by Arabic scholars and philosophers than in his own day, and influenced both the existing conception of geography and the plans for the future.

In the earlier centuries of the Christian era and under the domination of the Church, geography gradually entered upon a new phase, and some works of great significance appeared in this period. Early Christian Geography must therefore find a place here because it fills in the gap between the Greek and Roman Geography and its revival under the Arabs.

The earliest work of this period appears to be the Roman itineraries or distance tables worked out by careful measurement over the road system. Such work was indeed Rome's best contribution to geography and had been going on from a much earlier date than that of the famous *Antonine Itinerary* (3rd Century). There is also attributed to the first half of the third century the so-called *Peutinger Table*, which showed a sort of diagram of routes by lines on a strip which exaggerated the east-west distance from Britain to the mouth of the Ganges as compared with that from north to south, but was of the nature of a map in showing topographical features to some extent. Of the same century, but probably the second half, was the *Stadiasmus of the Mediterranean Sea*, the best example of the Periplus or collection of sailing directions, minutely detailed and clearly distinguishing the landmarks and accommodation for ships along the coasts. Lastly, the Christian pilgrimages to Jerusalem gave occasion for somewhat similar work, for in 333, *the Jerusalem Itinerary* was compiled for their guidance by a pilgrim from Bordeaux, immediately after the adoption of Christianity as the established religion of the Empire. Subsequently the pilgrimage gave rise to a considerable literature down to the tenth century, but it is not of much geographical significance. An interesting survival, however, is found in the work of the Ravennese Geographer, who, probably about 650 drew upon a wide range of early authorities, irrespective of creed, in compiling a kind of gazetteer of the world. He certainly used the material of Roman itineraries and also of Ptolemy and he referred to a large number of other authorities, which suggests how much more extensive than we know was the geographical or quasi-geographical literature down to his time. The Ravennese Geographer's results are not good; his inaccuracies as a compiler are many and to originality he has no claim.

It may be said broadly that in this period there are plenty of writers about geography but no geographers.

We need do no more than cite a few outstanding examples illustrative of various outlooks.

There has always been a popular phase of geography which has associated the marvellous with the unknown. We might cite the Homeric poems as an early repository of such writing; the taste for it persisted through the classical period, and became strong in the Middle Ages. The want was met (and not about unknown lands only) by the work of Solinus (250), entitled *Collectio Rerum Memorabilium* (the Collection of Wonderful Matters). He has been described as a plagiarist of Pliny and Pamponius Mela, and we may leave him at that, noticing him only as an example of a type, and as a writer who through the popularity of his work had a very bad influence upon Christian geography long after his own time.

Of a different stamp was the last important Roman historian, Ammianus Marcellinus (c. 335-391), who had military training and experience, and who recognized the value of geography in relation to history. He made free use of Ptolemy, and the Greek tradition in historical geography reappeared in his work.

Cosmographical questions became deeply involved. Although the doctrine of the spherical earth had come to be accepted in the pre-Christian period, a firm belief in favour of the flatness of the earth was probably held by the majority of the earlier Church Fathers. Not only were the ancient proofs of sphericity (which were never questioned by serious thinkers since the time of Pythagoras and Plato) overlooked, but such ideas were regarded as heretical. Elaborate new theories were devised and raised on the weak foundations of little-understood Scriptural texts, in which there is nothing definite on the subject and whatever occurs there in this connection is wholly incidental to other subjects. The Latin Father Lactantius Firmianus (c. 260-340) endeavoured to prove by pseudo-scientific means that the earth is not a sphere ; a spherical heaven, he argued, does not necessitate a spherical earth; and

the idea of the possibility of antipodes was to him thoroughly absurd. On the other hand, Augustine was non-committal in this regard, evidently troubled and puzzled by contradictory statements in the Bible and in the writings of classical astronomers. Isidore quotes ancient philosophers who favoured a spherical earth, but he himself conceived of a flat earth surrounded by a spherical heaven. Venerable Bede (c. 672-735) on the contrary, did not believe the earth to be a flat disc and cited as proof the fact that stars visible in one latitude are invisible in another. This is a distinct suggestion that the higher intellects among the Christian fathers shunned the subject partly because their own understanding would have bidden them to adopt the pre-Christian view, and that in teachers of the school of violent denial (like Lactantius and Cosmas) for all their diligence in reading, we have the type of an ill-educated bigot. To Capella (3rd century), however, may be ascribed much of the credit for keeping alive the doctrine of sphericity during these centuries. His immensely popular work, with its condensed argument in favour of a globe-shaped earth, doubtlessly contributed to the formation of opinion of Christian writers in his own and the following period.

Christian cosmography reached an extraordinary development in the work of a Christian traveller Cosmas, of Alexandria, who flourished in the second quarter of the 6th century. He was a merchant in earlier life, and travelled fairly widely, as far as Ethiopia (where he was in 525) and the Indian Ocean, probably visiting the Persian Gulf, the west coast of India and Ceylon. He afterwards became a monk and set down an account of the lands he visited. He wrote a book on geography entitled *Christian Topography*, apparently in the period 535-47. His central object was the refutation of the theory that the earth was round and to prove that Moses' tabernacle was a model of the Universe He also wrote a most extensive work on geography, which is lost, but from which the so-called eleventh book of the *Topography* (on Ceylon) may be an extract.

The work of Cosmas is full of absurdities. In spite of the dogmas "evolved out of holy Scriptures" he is of interest to us as the last of the old Christian geographers, and in a sense too the first of the medieval. It is probable that the crude diagrams and illustrations which accompany the earliest existing manuscript of the *Christian Topography* (10th century) are Cosmas's own; if so, they are the earliest extant example of Christian cartography.

We pass over the mathematical geography of the early period; no discoveries were made, nor were there any attempts to apply the results of older discoveries. Gerbert (end of the 10th century) gives a few details of the division of the earth's surface into seven climates, details of which he had probably derived from Pliny and Capella, but nothing was done in the strict application of position, i. e. latitudes and longitudes, or in the application of principles to map-making.

Very few maps from these centuries are actually in existence, although there are frequent references to lost maps in contemporary literature, and many of the cosmographies and encyclopaedic works, such as those of Orosius, Isidore and the Ravenna Geographer, show undeniable indications that they were either compiled from maps or else were accompanied by maps as illustrations. With a few exceptions, the existing specimens of Christian Cartography may be classified as regards form in four groups, the character of each group being determined by the purposes intended to be served.

The first group, which belongs to the earliest period, consists of outline diagrams illustrating Macrobius's division of the earth's surface into zones. This group cannot properly be said to include true maps. The second group is made up of simple representations of the three continents, often called *T-O maps*. On these the known world is shown as a circle within which a *T* is drawn dividing it into three parts. East is at the top. The upper compartment, that

above the crossbar of the *T*, represents Asia; the two lower compartments, Europe and Africa. The surface is usually unadorned by conventional symbols of any sort and the legends are reduced to a minimum. An extremely large number of *T-O maps* are to be found in codices from the eighth century onwards.

The third group of maps, the Sallust maps, are closely akin to *T-O maps* but are somewhat elaborate. They accompany manuscripts of Sallust's work, and may have been drawn by him to illustrate the description of the countries of the known world. The *T-O* form is carefully followed, but legends and pictures add a touch of life. Later specimens reveal the influence of Christian tradition, and upon them Jerusalem figures prominently.

The fourth group or *Beatus Maps* is by far the most interesting. Beatus, a priest of the eighth century, attempts to demonstrate graphically the division of the world among the twelve apostles, which is mentioned in his *Commentary on Apocalypse*. The original map is lost, but subsequent maps on the same models show immense wealth of detail, legends, vignettes and pictures of all sorts.

The case of India and China is widely different from the Mediterranean Basin. They most probably developed the study of geography earlier than the Western world and on lines of their own. Their remote situation and strongly marked boundaries cut them off from any but the most limited contact with the others till they took to ocean navigation and contacted the neighbouring countries. In general, therefore, the history of the development of geography in Ancient India is the least known, except that perhaps astronomy was highly developed long before the time when the Alexandrian and Ionian schools in Eastern Mediterranean were experimenting on the determination of the size and shape of the earth. The *Sulvasutras* and the work of Ápastamba suggest that Indian mathematics, including geometry, theory of numbers and astronomy, influenced the Pythagorean school as far back as 500 B. C.

Before the beginning of the Christian era Indians had overrun the East Indies, and had trade relations with the Persian Gulf countries and the N. Eastern African littoral on the one side and China and S. Eastern Asia on the other. Some narratives of Ancient Indian writers have come down to us but, as with the history of all other sciences in India, it is exceptionally difficult to put these narratives in a correct order for lack of definite chronology. For instance, one may have some idea of the Vedic Geography, of the Geography of the Mahábhárata, Puráṇas and Rámáyaṇa and other contemporary or later works, but for the reason mentioned, it is difficult to trace the development of Indian geographical ideas as clearly and as logically as that in the Mediterranean Basin.

From the point of view of Arab scientific development, the important fact is that Indian influece existed in the pre-Islamic Persian Academy of Jund-i Shápúr in the 6th century, from where Indian works, particularly on astronomy and medicine, were carried over to Baghdad which remained the centre of Arab learning for centuries. The Arabic translation of the *Siddhánta* was a landmark in the history of Arab astronomy. Al-Khwárizmí prepared two editions of *Sindhind* and epitomized it and the great astronomical works which were then available in Arabic in his *Zíj* One of his books "On Indian Calculation" established the fact that Indians had their own system of computation which was entirely different from that of the Greeks.

Now if we turn to the Far East, we shall at once realize that China has always remained the land of a peculiar people, and this distinctive character is very prominent in their geographical writings and allusions. Take, for example, the record of the greatest of their pilgrim-travellers. Huen-Tsang performed journeys of extraordinary reach, difficulty and importance, yet in his lengthy memoirs there is surprisingly little geography. The bulk of his work is taken up

with religious meditations and with disquisitions upon points of philosophy and morality and even grammar. He has many descriptive passages, it is true, but they usually relate to religious processions and other spectacles, to the scenes of the miracles of Buddha, to his relics and to shrines and other sacred buildings of India. He gives the impression of a man chiefly devoted to abstruse speculation and reflection, and his interest in the world of the effective traveller or explorer is but slight. He cares little about facts as weighed against ideas.

And the same may be said in general of the other narratives of Chinese travellers. Their geography, like all their observations on material facts, is incidental, and is generally overlaid by a great amount of what we may call talk about abstractions, especially of ethics and metaphysics, and is also hampered by the form of their language and their half-contemptuous indifference to the customs and nomenclature of most other countries. Western places, names of persons, empires and nations are designated by nicknames! The whole of their record of foreign lands is mystified behind the peculiar Chinese nomenclature, and this leaves many of the identifications that have been attempted scarcely more than probable at the best. This means that one has to rely more on the accounts of foreign missionaries, travellers or traders who visited China from time to time.

The narratives of Buddhist pilgrims are mainly concerned with India—the land of Buddha, but the Chinese annals are strangely imperfect in their notices of the sacred country. The records of Fa-Hien and Huan-Tsang are full of matters of interest to a historian or a philosopher but facts of geographical interest are singularly absent. The only information of some interest to a student of historical geography will be that during the period between 650 and 700 no fewer than 56 travellers mostly native Chinese followed the footsteps of Fa-Hien and Huan-Tsang

and travelled by various routes to India. About half of them seem to have taken the ocean route from the China Sea to the Bay of Bengal, and the rest followed one of the *overland tracks to the north or south of* the Kuin-lun; and a surprising number of the latter made their way through the dangerous and difficult route through Tibet and Nepal.

There is not much information regarding the development of cartography in China. It is known that in 721 the Priest Y-Hang was commissioned to make a survey of the Celestial Empire by "triangulation" and that observers were also sent at the same time into Cochin-China, Tonquin, South India and Northern Tartary to observe the respective length of days and nights, and the movements of those stars which are not visible on the horizon of Singanfu. It is also memorable that at the beginning of the 9th century a Chinese official named Kiatan constructed a map 33 feet long and 30 feet broad, planned out in squares of fixed size, in which the Celestial Empire, India, the Caliphate and the Dominion of Constantinople were all inserted.

Chinese geography reminds one of Indian and Arab conceptions. If one refers to the picture of the world given in the preface of Huan-Tsang's *Record*, one will find that in the middle of the world and surrounded by the great sea is Mt. Sumeru fixed on a circle of gold, and the sun and moon revolving round it. On various sides of this are seven sacred mountains and seven seas, as well as the four continents where men have made their dwelling. In the midst of the Southern Continent (i.e. Asia as known to the Chinese) lay the 'Cool Lake' (source of the Oxus) to the south of the 'Fragrant Mountain' and to the north of the 'Snowy Mountains'. From the eastern side of the lake through the mouth of a silver ox flows the Ganges to the S. East Sea, from the south of the lake through the mouth of a golden elephant the Indus flows to the S. West Sea. On the west of the lake through the mouth of

a horse of lapis lazúlí issues the Oxus to the N. W. Sea, and from the north of the lake through the mouth of a crystal lion proceeds the River of China to the N. E. Sea.

Chinese claim the invention of the compass, but apparently there is some confusion between the use of the compass proper and that of magnetized iron. Even at the lowest estimate, however, Chinese knowledge on this point was much farther advanced than that of the Greeks and the Romans. Pliny only describes its attraction for iron, but there is no hint regarding its property of indicating the north-south pole, whereas the Chinese certainly knew and applied both these properties as early as 121. Their method of employing a magnetized iron bar was to insert it in the arms of a wooden figure on a pivot, and beyond this the invention does not go further untill the 10th century. In other words, the needle had not yet been brought into use either floating on a straw in water or mounted on a pivot, and the south (which in China takes the place of the north) was indicated only by the outstretched hand of the little magnetized figure upon the prow of the vessel. It was on account of such magnetic indication, and through their reliance on this, that they dared to travel in the Indian Ocean on the largest ships ever made during the Middle Ages.

It is alleged that the Chinese discovered America, which claim is based on the most romantic and the most doubtful traditional voyage of certain Buddhist priests to the eastern lands, 'the Land of the Fusang Tree', the 'Land of Women', the 'Land of Marked bodies' and the 'Great Han Country', which have been identified with various points of N. E. Asia and the western coast of America. This is only a far-fetched possibility, since it is not supported by any authentic record except the geographical lore of Ancient China.

Human progress is far from being always continuous, and its course is more like the confused movements of a crowd, whose advance is only to be clearly seen after

many swayings and stoppages, than the orderly forward march of an army along a military road. Early Arab geography is a good illustration of this. For about 200 years the new religious interest seems to exercise little effect in the advancement of Arab geographical science; yet under the Arab civilization was at last awakened an interest in both practical and theoretical geography greatly transcending that of the ancient world. We must therefore look behind the Arab geographical literature for the vitalizing factors for the progress which certainly was being made possible. The early Arab period was, after all, a time, not of harvest, but of planting. Arab life and manhood were regenerated, but the Arab mind seemed to lie fallow for a time.

Serious study of geography and allied sciences among the Arabs started with great vigour under the first four of the 'Abbásid Caliphs. The period of ascendancy of Islam naturally coincided with the retrogression of Christendom, which was cut off from access to the Western Sea beyond the Bay of Biscay from the 8th to the 12th centuries by the Spanish Caliphate, and was denied all approaches to the East and South by the Muslim block which extended from *al-Maghrib* to the Indus. The courts of the Caliphs and the Muslim princes stole away some of the ablest of Western and Eastern thinkers till in the 9th and the 10th centuries, the triumph of the Prophet's followers in every art of life, in every comfort, in every science, over their old western rivals was complete.

The geographical myth, however, continued to dominate early Arab geography and was a real and formidable barrier to the progress of the science of geography for some time. The terror and ignorance of nature led to strange and fantastic narratives, and the imagination of folly and of pseudo-science peopled the world with monsters and contained the seas with impenetrable darkness and travestied many known facts of geography by an attendant fiction which tended to supplant the original.

Arab geographers as compared to Greek geographers made great strides forward, especially in this respect that as Barthold claimed—they assigned greater value to civic and cultural life, to the description of manners, language, and belief, than did most Greek authors. The determination of the geographical latitude and longitude of places, especially in the case of al-Bírúní, is so exact, and the data for the lines of march, especially with the geographers of the Mughal period (Qazwíní and Ḥáfiẓ Abrú) are so explicit that a map of Iran and Transoxiana compiled from them would show no very great mistakes as compared with our present maps.

On the other hand it must be admitted that the extent and accuracy of the knowledge displayed is hardly in harmony with the amount of work done and actual explorations made. Arab geographical authors were strangely reticent regarding ,some of the greatest and most fruitful voyages of discovery. Not content with neglecting good information, geographic authors were prone to cherish false reports long after these had been exploded by fresh explorations. Pre-conceived ideas, e. g. the Caspian Sea as an inlet of the Northern Ocean, the coast of Africa extending towards the East Indies, the land of Gog and Magog, the bugbear of the Atlantic, etc., once created, died hard, and acted as a continuous deterrent to precise and correct thinking and further explorations particularly across the Atlantic and round Africa. Even in some standard Arab geographical works exact geographical entries located by latitude and longitude have been shown up as wholly delusive. Bearings were often derived from computations based upon travel records rather than from direct observation, but the computations frequently erred by a big margin. Fully explored regions were faultily plotted, and even the Mediterranean, the Persian Gulf and North Africa were not properly mapped.

The reasons for the imperfections of Arab Geographical

writers are partly to be sought in the nature of their sources. Not infrequently the records of explorations were left unpublished. There is no doubt that many voyagers whose ventures had a commercial object kept the results of their investigations secret for fear of losing a profitable monopoly. Others issued deliberately misleading statements, in which fictitious terrors (like sea monsters, griffins, ferocious animals, peculiar human beings, etc.) played a nicely calculated part. Others again, though not intent on deceiving, continued to do so by the narrowness of religious make-up or perfunctoriness of their observations, which did not extend beyond their mercantile or missionary objectives. Again, the primitive character of the equipment impaired the accuracy of their records. In particular, the lack of fully adequate instruments for measuring distances and taking bearings could play havoc even with a scientifically minded explorer, and might seriously distort the map of his discoveries.

A further obstacle to the growth of geographical knowledge in proportion to the progress of discovery lay in the absence of a proper organization for testing the reports of explorations. For want of such an organization, it was equally possible for a swindler to be taken at his face value or for a genuine traveller to be refused credulence Under such conditions of uncertainty it was unlikely that geographic authors could sift the grain from the chaff of travel records with exact discernment.

Historians of geography have tended to neglect the contribution of the East in ancient geography. This tendency is more noticeable in the case of medieval geography where Arab geography was either ignored or given very little attention. This indifference may be due to the difficulties of language and the dramatic appeal of the great Age of Discovery which immediately followed it. The Arabs, in fact, collected geographical ideas from the Greeks and Romans in the West, China, India and Persia in the East, added to these the results of their

own observations, and research, and evolved new theories. They developed these theories with great vigour and speed, produced innumerable books on the various aspects of geography and allied sciences, and carried their knowledge to far-off lands from the shores of the Atlantic to the Pacific and the Indian Ocean. They remained masters of these sciences for centuries and then succumbed to new forces from the West. It may be realized, however, that small as the known world was during the Middle Ages, and naive as may have been man's conceptions of it, Arab geography was none the less the central element in the scholarly background of the Age of Discovery that followed it. The Renaissance in Europe brought no sudden and complete emancipation from old modes of thought. While Arab geography persisted and some of its errors may have restricted subsequent progress, on the whole the positive achievements of the 15th or 16th centuries would have been impossible had it not been for the enlightenment transmitted from the centuries that went before by the Arabs.

Important works on Arab geography and geographers began to appear by the middle of the 19th century. Arab geographical literature is not accessible to wider circles even in the East. Attention has been principally devoted to the editing of the oldest geographers (publications of de Goeje, Barbier de Meynard, Nallino, Mzik, etc). Of these, however, few have been translated into European languages (al-Mas'údí, Ibn Khurdádhbeh, Qudáma, Muqaddasí, al-Battání, Ibn Baṭṭúṭa, al-Bírúní, Abu'l-Fidá and in part al-Khwárizmí). The works of some of the most authoritative geographers have not yet been discovered (al-Jayhání, complete edition of Ibn Khurdádhbeh, *Ṣuwar al-Aqálim* of Rashíd al-Dín, etc), and most of the works discoverd hitherto are still preserved as manuscripts in libraries all over the world. There are so many branches of geography for which rich material can be available but has practically been neglected. In this

very little work has been done so far. Among works erit we have that of Barthold on the history of the .tion of Western Turkestan, whereas similar works draw- ›m still richer sources could be written for the Nile 7, 'Iráq and Iran. V. Minorsky's Commentary on *d al-'Álam,* Le Strange's *Lands of the Eastern Cali-* and J. H. Kramers' article on 'Dughráfiyà' in the *:lopaedia of Islam,* deserve special mention as they contributed a great deal to our knowledge of Arab aphy in general. Besides, some authors treat the ls and explorations of Arabt ravellers and explorers, s deal with various problems of geography, but none ıem deal with the history of the development of Arab :aphical thought and a survey of Arab geographical .ture with greater fullness and more proper orientation M. Reinaud.

M. Joseph Toussaint Reinaud (1795-1867), who was ssor of Arabic and Membre de l'Institute de France :e author of a classical work entitled *Geographie ıulfeda traduit de l'arabe en francais et accompagnes otes et d'eclaircissements* in two volumes. The first ne was published in 1848 and contains a *General duction to Oriental Geography* (450 pages) in four . The first part of the introduction deals with the ketch of Abu'l-Fidá, an Arab geographer of the early 14th ıry, and an account of his literary activities. The d part describes the life and works of important and Persian geographers from the beginning of Islam about the 14th century. The third part deals with ;eographical ideas of the East in general and the Arabs articular. The fourth part is a note on Abu'l-Fidá's *aphy* and the plan followed by Reinaud in his trans- ›. The second volume was published in two parts; first was published in 1848 and contains the first of the translation of Abu'l-Fidá's *Geography,* while the d was completed by M. Stanislas Guyard in 1883, gives the rest of the translation and a general index.

For a student of History of Geography the second and the third parts of Reinaud's *Introduction* are very interesting and instructive. Their value is two-fold. Firstly, this was the first attempt by a scholar to give a complete survey of Arab geographical literature for a period of over 500 years. Besides, he traces the evolution of Arab geographical thought, and in doing so takes into account the possible influences from all directions which shaped Arab geography to its final form. His remarks are based on a wide and exhaustive study of material available in the Western libraries.

To render this important work more accessible to a student of Historical Geography an attempt is therefore made to translate the 2nd part of Reinaud's *Introduction* into English, which is presented in the following pages. More information on this subject has come to light since Reinaud composed this important work, thus rendering his remarks out of date on some occasions. This possible defect is partly eliminated by introducing additional notes in the translation wherever any discrepancy or need has arisen.

The translation, as far as possible, follows the French text. The foot notes as given in the original book are translated and indicated in their appropriate places by Arabic numerals. Additional notes by the translator are arranged according to the letters of the alphabet.

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1

THE BIRTH OF ARAB GEOGRAPHY

The Arabs as long as they lived within the bounds of their deserts did not have an idea of geography in the proper sense of the word. As a matter of fact during the early centuries of the Christian era, the people of Arabia Felix [a] overran the coasts of the Red Sea, the Persian Gulf and the Erythraean Sea. [b] They had succeeded the Phoenicians in the commercial activities of these parts. They served as intermediaries between Egypt and Syria on one side and the vast peninsula of India on the other. [1] It will be seen later that the influence of Greek and Indian sciences penetrated into Arabia and even reached Muḥammad. But these influences did not go beyond the coasts and some of the commercial cities of the interior, such as Mecca and Medina.

The concept of geography, even in a crude form, did

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1 See *The Periplus of the Erythraean Sea,* as well as the narrative of Agatarchides in *Geographici Graeci Minores.*

(a) Ptolemy divided the Arabian Peninsula into three major regions, viz. Arabia Petrea (Arabian Rocky Desert), Arabia Deserta (Arabian Sandy Desert) and Arabia Felix (Inhabitable Arabia), which includes present Hijaz, Yemen, Hadramaut, Oman and Bahrain.

(b) Arabian Sea.

not come to the Arabs till after the death of Muhammad, when, bursting out of their solitude, with sword in one hand and the Qur'án in the other, they envisaged the entire world open to their exploits. Their first conquests were made without any determined plan and were almost hazardous; but as soon as a country was subjugated, an attempt was made to trace its limits and routes and very quickly they found out its various resources The results of these works were brought over to the seat of the Government. An Arab author tells us that when the Muslims had conquered the greater part of Spain and the southern provinces of France, the Caliph of Damascus demanded from the Amir of Cordova a sort of geographical and statistical description of the newly subjugated regions.[1] A circumstance which necessarily contributed to the progress of geography was the obligation upon the Muslims to perform the pilgrimage to Mecca, even from the remotest provinces, at least once in their life time. The vast extension of Muslim possessions rendered voyages of this nature prolific in observation.

The geographical science, like other sciences in general and astronomy in particular, began to take shape in the work

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1 See my book on the invasion of France by the Saracen pp. 15 and 16.

(*a*) The pre-Islamic Arabs were not totally devoid of geographical ideas. Some knowledge about geographical conditions in Arabia is reflected in the ancient Arabian poetry. Besides, there are some geographical notions found in the Qur'án, though they are very scanty. Again, some primitive geographical notions, which the Arabs inherited, must have been rooted in a very ancient past and transmitted by Jewish and Christian circles. They were often more of a cosmographical than of a geographical nature. However, the Muhammadan geographical literature may be said to have started as a literary category of its own only after 800 A. D. and occupation with geographical matters as an object of study could only begin at a time when Muhammadan civilization had taken definite form and gathered round its first important cultural centre Baghdad (J. H. Kramers, Djughrafiyá, EI Suppl. p. 62).

of the Arabs in the latter part of the 8th century [a] and established itself in the first part of the 9th. [b] Use was made of the itineraries prepared by the commanders of the conquering armies and of the descriptions rendered by the governors of the provinces ; and at the same time of the methods propagated by the Indians, Persians and chiefly Greeks, which resulted in a high degree of precision in their technique.

The geographical science of the Arabs was based almost from the very beginning, upon mathematical principles. [c] For example how could one have an idea of the location of a place, even approximately, in relation to another without knowing its longitude and latitude and its position in regard to the celestial phenomena. The *Almagest* and perhaps the *Geography* of Ptolemy, the two works which had comprised the depository of the knowledge of Greeks in the application of mathematical sciences to the perfection of geography, had been translated into the language of the Persians under the powerful dynasty of the Sásánids, during the 5th century of the Christian era. Later on towards the middle of the 8th century these works were rendered into Hebrew and

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(*a*) During this period Ibráhím al-Fazárí (c. 777) constructed an astrolabe for the first time and wrote a number of monographs on astrolabe, armillary sphere and calender. A portion of his *Kitáb al-Zíj* is preserved by al-Mas'údí in his *Murúj adh-Dhahab* (ed. Barbier, Vol. *IV*, p. 37 sqq.). Al-Fazárí's son Ya'qúb was the first to be mentioned in connection with Hindu mathematics.

(*b*) 'In the IXth century there was composed for the first time a series of treatises dealing chiefly with geographical matters. These matters were treated at that time from very different points of view and they evolved only gradually to a more or less established literary form that constituted the chief characteristic of the classical period of Muhammadan geography, which period comprises the Xth and the XIth centuries.' (J. H. Kramers; EI Suppl. p. 62).

(*c*) It will be interesting to note that in the first half of the 8th century mathematical work was done almost exclusively by the Chinese, while in the second half of the same century almost all

(Contd.)

Syriac and it was from these languages that they were translated into Arabic. These two books were compared with the observations made in Persia under the Sásánids[1] and with the results achieved by the Brahmins upon the banks of the Ganges and the Indus.[2] Very soon the Geography of the Arabs assumed a definite form, and since it included in its domain vast countries which were unknown to the Greeks and the Romans except in name, the Arab Geography lost no time in making a place for itself. At the same time it must be pointed out that geography and the related mathematical operations were not bounded as before by the limits of the provinces of the Roman Empire; it now included Persia, India, Transoxiana etc. Besides, geographers and astronomers on the banks of the Guadalquivir, the Nile, the Euphrates, the Indus and the Oxus distinguished themselves by more or less precise works.

The denominations which were used by the Arabs to designate the science of geography could not escape the effect of circumstances which determined the character of this science. They called it *djagrafya*,[3] a word which is

of the mathematical and astronomical work was done by the Arabs, who were inspired by the Indian as well as the Greek learning.

1 Not. Ext., Bib. roy., v. VII, p. 234.

2 I have dealt with this question specially in the second part of my Memoirs on India, see *Memoires de l'Academie des inscriptions*, v. XVII, part 2.

3 جغرافيا See Dic. Bib. Kf. published in Arabic and Latin by M. Flügel under the title, *Lexicon Bibliographicum et encyclopoedicum*, Leipzig, 1835 and the following years in 4°, V. II, p. 601. Ḥáji Khalfa under the word جغرافيا gives some details on the origin of this nomenclature.

(According to Kramers the word Djughráfiyá itself came rather late to denote the science of geography. The older Arab geographical authors used it mostly for the works of Ptolemy and Marinus and the use of the word for the science of geography علم الجغرافيا is found for the first time in the *Rásá'il* of the Brethren of Purity, but even here it

(Contd.)

'nothing but the equivalent of the Greek word *geographia*. Various other names were given to it e.g. the 'science of routes and realms',[1] the 'science of relays',[2] and the 'science of longitudes and latitudes.'[3] The last but one denomination alluded to the posts which were established early by the Caliphs, on the pattern of the Roman Empire.[a]

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is given the interpretation of a 'map of the world' (صورة الارض) and this meaning remained prevalent throughout the Middle Ages, EI Suppl. pp 61-62.........tr.)

1 علم المسالک و الممالک See Dic. Bib. Kf. under the word الممالک و المسالک and also under المسالک و الممالک

2 علم البرود The word برود is the plural of برید or barid.

3 علم الاطوال و العروض See Dic. Bib. Kf. under the word كتاب الاطوال

(a) Geography to the Arabs meant not only the distribution of land-forms but also the causes of such distribution for which they invoked the help of other sciences Thus they included within its field historical explanations of natural features and the formulation of scientific laws and also a study of social and economic activities of Man on the earth's surface. It is really their treatment of the subject from the human point of view which makes their contribution to geography valuable. They paid particular attention to the location of places for which the study of mathematics and astronomy was indispensable. According to al-Muqaddasí (985) 'it is (an account of a region)—comprising a description of its deserts and seas, the lakes and rivers that it contains, its famous cities and noted towns, the resting places on its roads and its highways of commerce, the places of growth and production, its exports, and staple commodities, an account of the inhabitants of the different countries, of the diversity of language and manner of speech; of their dialects and complexion, and their religious tenets; of their measures and weights, their coins, with information about their food and drink, a description of their hills, plains and mountains, thick and thin soils, their fertile or infertile lands, unirrigated lands and forests, and an account of their industries and literary achievements' *Ahsan al-Taqásim*, tr. by G. S. A. Ranking and R. F. Azoo in the *Bibliotheca Indica*, As. Soc. Bengal, Calcutta, 1897-1910, p. 304).

The first attempt made by the Arabs to acquaint themselves with geography and mathematical sciences in general took place in Baghdad about the year 772 of the Christian era, during the Caliphate of al-Manṣūr. An Indian, very well versed in mathematics, particularly trigonometry and astronomy, so far as these sciences were then developed by the Brahmins, came to the banks of the Tigris.[a] The Caliph ordered the translation into Arabic of a Sanskrit treatise named *Siddhānta*[b] or 'Absolute Verity', which had been brought by this Indian. This book expressed the movements of stars by the equations calculated with the help of sines from quarter to quarter of a degree,[c] according to Indian trigonometry, as well as certain methods for the calculation of eclipses and rising of the signs of the Zodiac[1]. The translation received

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1 Compare the *Bibliotheca Arabico-hispana Escurialensis* by Casiri, v. I. p. 428 et seq. and the second part of my memoir on India where I have explained certain terms which had not been understood by Casiri, for instance the word كرديجة which is an alteration of the Sanskrit word 'Cramadjia' or 'right sine'. The annotations which Casiri has given in his Bibliothèque on Arabic and similar works, are taken from an Arabic Manuscript, *Ta'rikh al-Ḥukamā'* or 'History of Philosophers'. This is a dictionary, in alphabetical order, of philosophers, physicians, astronomers—Indian, Greek, Latin, Jews, Christians, Sabians and Arabs from the creation of the world to the middle of the 13th century. This work which is also found among the manuscripts of the Bibliothèque royale of Paris, Arabic Supplement No. 672 and which has been often utilized by Abu 'l-Faraj is an abridged edition of a bigger treatise. The author of the original book was a vizir of Aleppo named Jamāl al-Din 'Ali, a native of the city of Qifṭ or Coptos in Upper Egypt, who died in 646 A. H. (1249). Immediately after the death of the author, the book was abridged by Muḥammad son of 'Ali, surnamed al-Zauzani (See the preface of the work of M. Wenrich called, *De auctorum graecorum versionibus et commentariis syriacis arabicis armeniacis persicisque commentatio*, Leipzig 1842 in 8°). The abridged edition only has reached Europe. The extracts of *Tar'ikh al-Hukamā'* published by Casiri have been reproduced by M. Sedillot in his *Introduction aux prolegomènes des tables astronomiques d'Ulug Beg*, Paris 1847 in 8°. (Al-Qifṭi's work has since been published under the title *Ta'rikh al-Hukamā'*, ed. J. Lippert, Leipzig, 1903.........tr.) *(Contd.)*

the title of *Sindhind*, the altered form of Sanskrit *Siddhánta*.

(*a*) Ya'qúb *b.* Táriq who was probably of Persian origin and one of the greatest astronomers of his period, probably met about 767 at the court of al-Manṣúr, the Hindu *Kankah*, who had brought there the *Siddhánta* with him. He wrote memoirs on the sphere; on the tables derived from the *Siddhánta* and the division of the Kramajyá. Kramajyá is sin 225′ *i.e.* the arc of the 96th part of a circle. Arabs and Hindus divided the circle into 96 parts instead of 360 as done to day.

(*b*) The earliest Hindu scientific works dealing with astronomy are the so-called *Siddhántas*. These are treatises largely theoretical, as opposed to works of a more practical nature called *Karanas*, and to tables and commentaries. There are five *Siddhántas* : the *Súrya Siddhánta*, the *Paulisá Siddhánta*, the *Paitamaha Siddhánta*, the *Vasishtha Siddhánta* and the *Romaka Siddhánta*. They are probably post-Ptolemaic and precede Aryabhatta and Vramahira's work. Of these *Súrya Siddhánta* is the only one which seems to be completely extant (Al-Bírúní, India, Ch. 14 ; I. H. S., Vol. I, p. 387).

(*c*) I could not find an explanation of this point.

2

DEVELOPMENT OF GEOGRAPHY UNDER AL-MA'MŪN

The attempts made under al-Manṣūr gathered a new momentum during the reign of Caliph al-Ma'mūn, who ascended the throne in 813 and who exhibited a great zeal in favour of the sciences. Not only did the prince favour the Nestorian Christians and the Jews of his kingdom who till then were the custodians of Greek sciences, but he aspired also to develop among the Muslims an aptitude for drawing from these sources of knowledge. He collected at great expense Greek works, and from these precious treatises constituted a library and put it at the disposal of the learned men of his court, who soon rendered the writings of Euclid, Archemedes, Aristotle [1] etc. into Arabic. Later on some of these works could reach Latin Europe, which was then plunged into darkness, only through the Arabic versions. The Caliph did not forget to get translated into Arabic the *Almagest* of Ptolemy of which the Arabs till then possessed only a bare outline, [2]

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1 On these various translations, it would be better to consult besides Wenriche's work already cited, a thesis published by M. Flügel under the title *Memoriam anniversariam*, Meissen, 1814 in 4°.

2 Dic. Ibn Kh., ed. M. de Slane, Vol. I, p. 245, under the name *Hunayn*.

and also the treatise of *Geography* by the same author which was an indispensable work. [1] [a]

These two translations of which the latter has not reached us, along with the Greek treatise of Marinus of Tyre,[b] which again, has failed to reach us either in Greek or Arabic together with the Indian doctrines which in the beginning were admitted to be greatly creditable, served as the basis of the first attempts made by the Arabs, towards mathematical geography. The Muslims in the ardour of their new zeal clung to the saying attributed to their Prophet—"Seek knowledge even if it be in China". However, as far as the Arabic versions of Ptolemy's treatise are concerned, it appears that not only a part of these versions was prepared by the Syrian Christians but that these Christians, instead of referring to the original text, sometimes depended on the Syriac versions rendered earlier. This is proved by the fact that while Ptolemy computed by stadias, the writings in Arabic have only mentioned miles calculated on a fixed system. [2]

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1 Abu 'l-Fidá' (G. A. Vol. II, p. 97) gives to the translation of the treatise of *Geography* the title *Rasm al-Rub' al-Ma'múr* or the Description of the Habitable Quarter of the World, from which he borrowed some of his longitudes and latitudes. But the figures which he cites do not tally with those of the treatise of Ptolemy and it can be concluded that the *Rasm al-Rub' al-Ma'mūr* was not so much a translation of the Greek work as an imitation of the original which included such changes as took place with the times. (cf. the work of M. Rommel, entitled: *Abulfeda Arabiae descriptio commentario perpetuo illustrata*, p. 8, and that of M. Fraehn, entitled: *Ibn Foszlan's und andere Araber Berichte*, St. Petersburg, 1823, p. XVI et seq. Besides, an authentic translation of the *Geography* appears to have been made by al-Kindí.

2 See the Memoir of de Gossellin entitled *Recherches sur le principe, les bases et l'évaluation des différents systémes métriques linéaires de l'antiquité* (Vol. VI of the new collections, of *l'Académie des inscriptions*, p. 132).

(*a*) On the several data about Arabic translations of Ptolemy's work, see the article on Djughráfiyá by J. H. Kramers, EI Suppl. p. 6[illegible]

(*b*) Marinus of Tyre (c. 70-130). Al-Mas'údí mentions having consulted the *Geography* of Marinus, which had a world map attached to it (Tanb. pp. 30, 39, 110); cf. E. L. Stevenson, *Geography of Claudius Ptolemy*, New York, 1932.

Al-Ma'mún did not confine himself to the task of merely translating into the national language, the Greek treatises relating to geography and astronomy; he also wanted that the facts mentioned in these treatises be submitted to a fresh examination. Two observatories were founded: one at Baghdád and the other at Damascus and each of them was furnished with books, instruments and other indispensable equipment and several important writings were the result of this enthusiasm. Al-Ma'mún even ordered the measurement of two degrees of earth's meridian in the sandy plains of Eastern Syria as well as in the neighbourhood of Sanjar in Mesopotamia. This he did in order to check the Greek doctrines and to obtain a precise knowledge of the circumference [a] of the globe. [1]

Mas'údí, in the first half of the 10th century of the Christian era i e. the time when the monuments of Arabic literature were still lying intact, remarks, "I have seen the seven climes illuminated in different colours in several books but the best representation of this type which I have found is in the treatise of *Geography* by Marinus and in a map which was made for the Caliph al-Ma'mún for whose preparation several learned men of that period had pooled their knowledge. Therein the universe was depicted with the celestial spheres, the stars, the continents, the oceans, the inhabited lands, the deserts, the regions occupied by the different peoples, the big cities, etc. This map is much better than the previous ones, which appear in the *Geography* of Ptolemy or in that of Marinus and others". [2] [b] A passage of al-Battání,

[1] See Notices, Vol. I, p. 48 et seq. Vol. VII, p. 96 et seq. and § III below.

[2] *Kitab al-Tanbih*, Note by Silvestre de Sacy in Notices, Vol. VIII, p. 147. (cf. Al-Tanbíh, p. 33 ed. de Goeje, Leiden, 1894; Murúj, Vol. I pp 185, 205. ......tr.)

(a) His astronomers gave the following results:
Inclination of the ecliptic $=23°33'$;

(Contd. on next page)

which will be quoted in the next paragraph [a] tells us that in *the Book of the Figure of the Earth,* [b] the principal cities were disposed according to their longitude and latitude. [1]

Among the geographers, namely the mathematician geographers, who flourished under al-Ma'mún, mention may be made of Abú Ja'far Muḥammad ibn Músá, surnamed al-Khwárizmí because he belonged to Khwárizm. Al-Khwárizmí had been chosen by the Caliph to work as the librarian of the Baghdád Library. He composed, on the model of Ptolemy's treatise of *Geography* a book called *Rasm al-Arḍ* or *the System of the Earth.* In this work, which is probably the same as the treatise known as *Rasm al-Ma'múr or Rasm al-Rub' al-Ma'múr or the System of the Inhabited Quarter of the Globe of the Earth* [2] and which appears to have been confused with *the Book of the Figure of the Earth,* mentioned by al-Battání and Mas'údí [3], the name of each place was accompanied by its longitude and

(*Continued from last page*)

Length of a degree of arc on the earth = 56⅔ m.

Radius of the earth = 3250 m.

Circumference of the earth = 20,400 m.

Thus the computed radius of the earth was nearly 750 miles shorter than the actual size.

(b) cf. *Tanbíh* ed. de Goeje, p. 33.

1 Ibn 'Abdalláh Muḥammad son of Abú Bakr الزهري mentions in the preface of his book كتاب الجغرافية (Arabic MS. of Bib. roy. anc. fond. No. 596) that he has been guided by the treatise of الفزاري compiled during the Caliphate of al-Ma'mún with the concurrence of seventy scholars of 'Iráq. The treatise of al-Ma'mún contained a planisphere representing the earth.

2 See foot note 1 on p. 9.

3 The passage of al-Battání included the following words :—

و قد أثبتنا ذلک علي الرسم الذي علي مارسم في كتاب صورة الارض and وجدناه في كتاب صورة الارض Again, Mas'údí in his Kitáb al-Tanbíh, f. 21. V after mentioning Ptolemy's *Geography,* adds the following words ; ورسم الناس صورة معمور الارض علي مارسم فيها من مواضع الكون و الابحار و الانهار في الطول و العرض . (The text of al-Tanbíh as edited by

(*Continued on next page*)

latitude. [a] Al-Khwárizmí also happens to be the author of a

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Continued from the last page

de Goeje reads as follows : و رسم للناس صورة معمور الارض على ما رسم فيها من موضع الكور و الامصار و الانهار في الطول و العرض , p. 30. Şúrat Ma'mûr al-Arḍ referred to in this passage by al-Mas'údí most probably refers to the work Maskún al-Arḍ mentioned earlier in this context by al-Mas'údi. It is not the name of a book as understood by Reinaud. Al-Khwárizmí's Kitáb Şúrat al-Arḍ *is referred to elsewhere by* al-Mas'údi, see Murúj, II, p. 308 ......tr.)

(a) In the second volume of this book.

(b) كتاب صورة الارض

(a) Al-Khwárizmí's treatise and its origins are of interest to us since certain facts given there were taken over by the author of Toledo Tables which were much popular in the 12th. century and afterwards. A MS. of *Şūrat al-Arḍ,* the only one in existence, was discovered by Wilhelm Spitta in Cairo in 1878 and described by him in an article entitled "*Die Geographie des Ptolemaeus bei den Araben,* 1882. Spitta's article was superseded by Nallino's critical work (*Al-Huwarizmi e il suo rafacimento,* 1894). Nallino suggested that the work was not a direct translation from Ptolemy but was composed to elucidate and explain a map which itself was compiled directly from a Greek, not Greco-Syrian version of Ptolemy's *Geography.* The fact that al-Khwárizmí's figures in many cases diverge from those of Ptolemy may be explained by the supposition that they were reconstructed from data given on a map, rather than copied from the text of Ptolemy's *Geography.*

Later and more thorough investigations into the *Kitab al-Arḍ* by Hans von Mzik confirm Nallino's opinion that the treatise was based upon a map but show that the map itself must have been compiled from the Syrian text. Al-Khwárizmí's work embodies the results of Moslem geographical calculations which had tended to correct Ptolemy's overestimate of the length of the Mediterranean Sea. (von Mzik, Ptolemaeus, 1915, pp. 152-176). cf. J. H. Kramers, 'Djughráfiyá' in EI pp. 63-65.

Al-Khwárizmí's book is more on the Greek model rather than on Indian. The text and maps of his book show a great improvement on Ptolemy's *Geography.* The text of Şúrat al-Arḍ as contained in the unique MS. of the Univerity of Strasbourg has been published in the B. A. H. U. G. edited by Hans v. Mzik, Leipzig, 192?.

On a reconstruction of al-Khwárizmí's map of N. Africa to 150 lat. and for comparisons with the geographical knowledge of Ptolemy and al-Battání, see ISIS, vol. 208, 1916.

treatise on Algebra [a] which has lately been published in Arabic and English. [1] This treatise which was drawn up according to Indian doctrines, appears to have been abridged from a more voluminous book translated from Sanskrit into Arabic during the Caliphate of al-Manṣūr and disposed in a better fashion. [b] It was all the more valuable for the Muslims, because the apportionment of inheritances as instituted by the *Qur'ān* is an extremely complicated affair and it becomes highly difficult to make computations of certain cases without the help of Algebra. This version of the book spread to the West where it was translated into Latin. [2] Lastly al-Khwārizmī reproduced, in a new form, the *Sindhind*, which jointly with the Greek doctrines [3] became popular among the Arabs. [c]

A number of astronomical tables were composed under al-M'amūn. These tables had not only had for their object the celestial movements which were incidentally quite useful for the understanding of some of the physical phenomena, but they were considered necessary for the determination of the longitude and the latitude of principal Muslim cities, and it may be noted that by then the Muslims had become the

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1 The title of the book is *Algebra of Moḥammad-bin-Mousea*, London, 1831, in-8°. This edition has been published by one M. Rosen after a MS. of Oxford.

2 Some fragments of the Latin version have been published by M. Libri, in his History of mathematical sciences in Italy, Pairs, 1838, vol. I, p. 253 also p. 121.

3 *Tar'ikh al-Ḥukamā'* MS. of Bib. oy. supp. arab. no. 672, p. 234.

(*a*) Al-Khuwārizmī is considered to be the founder of analysis or algebra as distinct from geometry. His algebra contains analytical solutions of linear and quadratic equations.

(*b*) Reinaud does not indicate the source of his information regarding the existence of the voluminous book mentioned by him. May be he has borrowed the idea from Libri and Rosen whose opinion in this matter as it appears from subsequent criticisms on Khwārizmī's work, is not taken seriously by later writers. See Kaprinski's edition of Khwarizmi's Algebra, New York. 1915.

(*c*) Al-Sindhind al-Saghīr, see S. Maqbul Ahmad, Al-Mas'ūdī's Contributions to Medieval Arab Geography, Isl. Cult. Vol. XXVII, No 2, p. 71, note 74.

masters of the best portion of the ancient world. In fact tl religion of Muḥammad prescribes, as is known, five praye during the course of a day, at fixed hours. Moreover, grow up Muslims are required to fast during the daytime since tl visibility of the moon of the month of Ramaḍán, and the have to fast day after day throughout the whole mont Every village, and even every family, requires a chart whic could indicate day by day the movements of the sun and tl moon ; and these charts are prepared by astronomers of th cities, with the help of the tables of longitude and latituc which accompany all the astronomical treatises of some in portance. Associated with the principal mosques, there ar men who, appointed under the title of *mu'aqqit* [1], are re quired to fix the precise time of religious performances an among these men there have been distinguished astronomer To this may be added the utility of the astronomical table for the astrologers, who hereafter enjoyed immense prestig amongst the elite and the common people and which has bee conserved even upto our own time.

One of the astronomical tables composed under al-Ma'mú had Yaḥyá as its principal author who was the son of a astronomer who had distinguished himself under al-Manṣú and whose name was Abú-Manṣúr. Yaḥyá had been devotee of the religion of the Magi but in order to court th favour of the Caliph he embraced Islam. The table made b Yaḥyá carries the title of *al-Qiyás al-Mumtaḥan* or the 'Prov ed Argument'. [2] In fact, it contained the result of variou observations which were made simultaneously at Damascu and at Baghdád, and then combined with one another.

Three other tables were prepared by an astronomer wh originally belonged to Merv in Khorasan and was name

1 See the Catalogue of Oriental Manuscripts of the Oxfor Library by Messrs. Uri, Nicoll and Pusey, Vol. II, p. 285.

2 On Yaḥyá compare the Dic. Ibn Kh. under يحيى *Tar'ikh al-Ḥukamá'*, p. 289 and Notices, Vol. VII, p. 56. (The text an this note have Almomtanih:..... tr.)

Ahmad ibn 'Abdalláh better known with the nickname of Habash.[a] Habash who was trained in the Indian doctrines, based the first of his tables on *Sindhind*, particularly regarding the phenomenon of the trepidation of stars [1]—a phenomenon which was mentioned in the Greek treatise of Theon, and had also attracted the attention of the Indian scientists. The second table, the most celebrated of the three, bears the title of *al-Qánún al-Mumtahan* or the 'Proved Rules'.[b] The word *Qánún* which forms the title of a great number of Arabic treatises of various sorts is the reproduction of the Greek word *canon*, which in general means 'a rule', or 'a string used to establish a level.' The Persians when they began under the Sassanids, the translation of Greek books in their own language, employed the word *zíj* as an equivalent for *canon*. The word *zíj* is also used by the Arab astronomers concurrently with *Qánún*. Both of these indicate, as was the case with the Greeks, that the books so denominated contained facts rendered with great precision and exactitude.

Al-Qánún al-Mumtahan [c] was the frnit of careful obser-vaitons of the author himself combined with what science had already accomplished by then. The third table was based on the ideas which dominated in Persia at the time of the Muslim invasion, and it received the title of *al-Sháh*. The second table of Habash, for the sake of distinction from the other tables of the same author, was also called the 'Arabic Canon'.[2] In European treatises it is usually called

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1 اقبال و ادبار

2 Compare the Arab History of Abu'l-Faraj, p. 247 of the text, *Ta'ríkh al-Hukama'*, p. 147; the notes of Golius on the treatise of al-Farghání, p. 67 and Notices, Vol. VII, p. 160.

(*a*) Habash was first to determine time by the altitude of the sun. He also introduced the notion of shadow (umbra) equivalent to our tangent and compiled a table of tangents which appear to be the first of its kind.

(*b*) cf. Tanbíh, ed, de Goeje, p. 222.

(c) The text of Reinaud reads : Almomtanih.

the 'Verified Table'. a

(a) "Ḥabash b. 'Abd Alláh al-Marwazí al-Baghdádí, who ished during the second half of the third century / ninth century ('Ilm. Nallino, pp. 77,175). Al-Mas'údí ascribes three astronomical to him : i) Zíj al-Mumtaḥan, known as Zíju Ḥabash (written shortly 300/912; it is preserved in the Berlin Library. See Nallino, pp. 248- al-Sindhind (based on Siddhanta. Nallino, 175); iii) ash-Sháh (t on the Persian style, Nallino, p. 188), Tanbíh, ed. Cairo, pp. 18 [S. Maqbul Ahmad : Al-Mas'údí's Contributions to Medieval Geography, Isl. Cult. Vol. XXVII, No. 2, p. 71, Note 76 (b)].

3

PERSIAN, GREEK AND INDIAN INFLUENCES.

One can see what big influence the Indian and Persian doctrines exercised upon the Arab sciences. The book which contributed most in preserving the Indian traditions among the Muslims, was one which was brought to light by al-Khwárizmí to whom a reference has already been made. This book was entitled *Little Sindhind* which is entirely different from the treatise prepared in Arabic during the reign of al-Manṣúr. Al-Khwárizmí confined himself to what he found of greater utility in *Sindhind* and completed his work by means of borrowing facts from the Greek and Persian sources. It conformed to *Sindhind* as regards the mean motions [a], but for equations [b] he adopted the Persian ideas, and for the obliquity of the ecliptic, the ideas of Ptolemy. He even added to his various writings, the 'approximate methods' which were his own invention. This work, which offered a resume of methods used during the reign of al-Ma'mún, was a great success, and it has often been referred to by the later writers.[1]

1 Extract of *Ta'ríkh al-Ḥukamás*, by Casiri. Vol. I, p. 429. Casiri has added to the text its Latin translation which is not at all correct.

(a) Mean motions of the planets as given in the first Chapter of Súrya Siddhánta (Meerut Edition, 1867).

(b) Planetary equations.

The *Little* as well as the big *Sindhind*, the perusal of which might be quite interesting for us, have never reached hs, but the *Little Sindhind* was translated in the 12th century into Latin by Adelard of Bath and this translation has been preserved.[1] One of the most significant facts which emerges from the Latin version, is that Muḥammad al-Khwárizmí made use of trigonometrical methods, the invention of which has been attributed to al-Battáni, who came half a century later, and since similar methods are found in the *Súrya Siddhánta*[a]—the Sanskrit treatise composed many centuries earlier—one is justified to deduce that trigonometry, very nearly similar to what is current at present, is of Indian origin.[2]

Al-Ma'mún exercised sovereignty between the years 813 and 833, that is to say, for a span of 20 years. The different branches of mathematics were cultivated during his reign with very great zeal. Among the scholars who distinguished themselves in this class, mention should be made of the three sons of Músá son of Shákir. Músá was originally a resident of Khorasan and was in the beginning a robber by profession,

1 Amongthe manuscripts of the at Paris, thereMazarine Library is one manuscript which is named; *Libar ezith* (*al-zij*) *Zafaris el Kaurezmi per Adelardum bathonlensem exarabico in latinum sumptus*. A manuscript of the Bodleian Library at Oxford, carried the title "*Ezich elkauresmi, id est, tabulae Chawaresmi ae, per Ethelardum, bathoniensem ex arabico traductae.* On Adelard, compare Jourdain *Recherches critiques sur l'age et l'origine des traductions latines d'Aristote*", 2nd ed., p. 97, 258 etc. and the book published in London by M. Thomas Wright, with the title of "*Biographia brittanica litteraria, periode Anglo-normande*, p. 94, et seq.

2 See a curious memoir of M. Chasles (*Comptes re dus dessèances de l'Académie des sciences*, proceedings of the 2nd Nov. 1840). As regards trigonometry, I arrived at the same conclusion as M. Chasles long before this scientist published his memoir.

(a) Paulisa-Siddhánta (not Súrya Siddhánta). The Paulisa may be considered the foundation of Hindu Trigonometry, a very original development of geometry. It replaces the clumsy 'chord' of the Greeks by 'sine' and gives a table of 24 sines (and versed sines) progressing by intervals of 225′ (96th part of a circle).

but later on rendered some services to al-Ma'mún in his tussle against his brother al-Amín. The three sons of Músá showed a promising disposition towards the sciences and the Caliph therefore took charge of their education. The eldest one called Muḥammad distinguished, above all, in geometry, the second son named Aḥmad, in mechanics and the third son named Ḥusain, in music. [1]

Mention must also be made of Muḥammad son of Kathír, surnamed al-Farghání, because he originally belonged to Farghána, a place in the vicinity of the Jaxartes. Muḥammad composed an elementary treatise of astronomy drawn up, in general, in accordance with the Greek ideas. This treatise carries the title of the *Book on Celestial Movements and the complete Science of the Stars*. [2] Translated into Hebrew in the Middle ages, it was rendered from Hebrew into Latin [3] ; later on the original version itself was published with Latin translation and notes, by the famous Golius. [4] This treatise from which Abu'l-Fidá' has frequently reproduced many ideas in his preface, is remarkable, for, instead of one simple list of principal cities known to the Arabs in the 9th century, ac-

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1 Compare C-A. Vol. II p. 240; *la Chronique arabe d'Aboul Farage*, p. 279, and the *Ta'ríkh al-Ḥukamá'*, pp. 258 and 349. By mistake Abu'l-Faraj considered Moḥammad alive upto the reign of Caliph al-Mu'taḍid, i.e. upto the end of the 9th century.

2 كتاب الحركات السماوية و جوامع علم النجوم

3 This translation, made by Christmann, was published in Frankfurt in 1590 under the title of *Muhammedis Alfragani chronologica et astronomica elementa scholiis exposita; additus est commentarius qui rationem calendarii romani, aegyptiaci, arabici, persici, syriaci et hebraei explicat ;* a big volume in 8°. One may consult also with profit the explanations of Christmann.

4 The title the volume is *Muhammedis filii Ketiri, qui vulgo Alfraganus dicitur, elementa astronomica.* Amsterdam, 1669, in a small volume in 4°. Abul'l-Faraj, in his history of the Arabs, p. 248 and the author of *Ta'ríkh al-Ḥukamá'*, p. 57, give the author the name of Aḥmad son of Muḥammad. Golius had appended to the *Treatise* of al-Farghání, numerous and interesting notes. Unfortunately he died during the course of its publication and his work has remained incomplete.

companied with the indication of their longitude and latitude, it gives the description of the world divided into seven climes. In it the world, as was then assumed, is divided into seven zones, and every city that had some importance has its location marked in one of the seven zones. By knowing the clime of a city, one could only have an approximate idea of its latitude, but with its help one could know the respective lengths of days and nights in different times of the year, and this knowledge was sufficient for the needs of the religion : this is the reason why the division of the world into seven climes, which could be traced to Greek antiquity, served as a base for most of the geographical treatises in the use of the Muslims. The knowledge of the climes was particularly useful for the Muslims who made voyages to foreign lands.

Al-Farghání has, in addition, composed two treatises on the instruments which were commonly used by the astronomers of his time. The first is devoted to astrolabe, an instrument designed by Hipparchus to fix the position of stars in relation to the ecliptic. The astrolabe which has now fallen into disuse, was employed to measure the altitudes and was also used for making certain other observations which did not require much precision. In the second treatise he dealt with the construction of the *rukhámá* [1] or marble, that is to say, the sundial which consisted of a marble slab. [2] Al-Farghání died in 215 A. H. (830). [a]

Till then, the works pertaining to Geography, and executed under the Caliphate of al-Ma'mún, were restricted to mathematical sciences. As for the works regarding descriptive geography, a book referred to by Abu'l-Fidá' in his chapter on Arabia [3] may be mentioned. The author of that book is Naḍar son of Shimá'il Naḍar was born in Basra about the year 123 A. H (740) ; but in search of a liveli-

1 كتاب عمل الرخامات

2 Catalogue of the Oriental Manuscripts of the Oxford Library, Vol. II, p 286.

3 G-A. Vol. 2. p. 103.

(a) Math. Ast. Ar. (p. 18, 1900) ; EI Vol II. p. 66, 1914.

hood, and in view of the advantages which the Arabs enjoyed in the conquered lands, he left his home and got himself established in Khorasan. The title of his treatise is the '*Book of Species which show peculiar Characteristics*[1] or better still the Book of Characteristics.[2]

Here is a summary of its chapters : "Qualities of men and women ; tents and homes ; mountains and defiles ; camels, sheep and birds ; the sun and the moon, night and day ; milk and truffles ; pits and ponds, ropes and buckets ; wine, cereals, vine, grapes, vegetables, trees ; winds, clouds and rain".[3] Such a summary of chapters reveals that the treatise is meant especially for the nomads and presupposes a very imperfect knowledge. It is possible, as it happened in the case of Spain also, that the author specifically intended to make his compatriots of Khorasan, who were eager to learn the mode of life of their ancestors, acquainted with some details of the life of the desert.

It is not necessary to assume that during the reign of the Caliphs, knowledge was reduced to such vague notions. We have already noted that at the time of the first conquest of Spain and Southern France, the Caliph of Damascus had demanded from the Commandant of the troops a statistical account of the new provinces. The 'Abbásid Caliphs employed, in the alien lands, spies of both the sexes. Thus 'Abdalláh, surnamed Sídí Ghází served for twenty years as a spy of Hárún al-Rashíd in the Greek regions and catered information to this Prince who needed it for his dealings of war or friendship with the Emperors of Constantinople.[4] But this information was held as state secret and the government did not divulge it except what it considered advisable.

1 كتاب الاجناس على مثال الغريب

2 كتاب الصفات (Reinaud has translated it as *Recueil descriptif...* ...*tr.*)

3 C-A. V. II, p. 135 and Dic. Ibn Kh.

4 Fraehn, *Ibn-Fozlan's Berichte*, p. XXV.

Under al-Ma'mún and his first successors there flourished in Basra, 'Amr son of Bahr, surnamed al-Jáhiz, because he had protruding eyes. Basra, in those days, served as an intermediary between Mesopotomia and Syria on one side and the coast of Persia, the Eastern coast of Africa, India and China on the other. In this period, the existence of the cities of Kúfa, Wásit, [a] Mausil and above all Baghdád, the capital of the Empire, gave Basra a much greater commercial importance than it carries today. It can be said that the valleys of the Tigris and the Euphrates, as in the times of Nineveh and Babylon, had grown into a commercial centre of the world. Al-Jáhiz took advantage of the inflow of merchants who came from distant lands, in collecting material on natural history. He even dealt with their origin and character, and among his other writings there is a book entitled *the Book of Cities and Marvels of Countries.* [1] But it appears that the author's geographical ideas were far from perfect. Mas'údi[2] and al-Birúni [3] agree in their remarks that in conformity to a speculation which had formerly been expressed by the Greeks[4], al-Jáhiz supposed a communication of the Nile with the Indus.

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1 كتاب الامصار و عجائب البلدان C-A, V. II, p. 230; the Dic. Ibn Kh. V. I. p. 540, also the *Chrestomathie arabe* of M. de Sacy; 2nd edition; V. III, p. 495, and M. Wustenfeld's work entitled, *Geschichte der arabischen Aerzte und Naturforscher* Gottingen, 1840, p. 25. M. de Hammer possessed in his rich collection of Arabic, Persian and Turkish manuscripts a *History of Animals* by al-Jáhiz, This is probably the oldest work of its kind which exists among the Arabs. M.de Hammer has given the analysis in the *Handschriften arabische, percische*, turkische, Vienna, 1840, p. 127 et seq.

2 M-Dlf. supplement of the Arabic manuscripts of the Bib. roy. no 514, t. I. fol. 40. K-T. fol. 38 v.

3 See my Arabic and Persian extracts relating to India, Paris, 1845, p. III. These extracts appeared earlier in the *Journal asiatique.*

4 *Journal des Savants*, 1841, p. 480, article by M. Letronne.

(*a*) "A large town (in Iraq) in two parts. The Tigris flows through it and upon it there is a bridge. In each of these parts there is a *mimbar* built by Hajjáj-bin-Yusuf. The town has an equable climate and is the most pleasant town in Iraq. From it comes, trouser cords and dyed wool"—Hudúd al-'Álam, ed. V. Minorsky, p. 138.

4

SULAYMÁN THE MERCHANT.

As regards the maritime reports, we have a description of voyages made in this period by the Arabs and the Persians in the Indian and the eastern seas. This description has been written out from the accounts given by a merchant named Sulaymán, who was established on the coast of the Persian Gulf or its environs, probably in Baṣra, and who undertook many voyages to India and China. [a] It was written in the year 237 A. H. (851), a period during which sea communication between China and the Arab Empire had assumed an intense activity. I have published this description from a rare manuscript in the Bibliothèque royale[1].

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1 *Relation des voyages faits per les Arabes et les Persans dans l' Inde et á la Chine, dans le IXe, siécle de l'ére chréstienne,* Arabic text, French translation and notes. Paris, 1845, 2 vol. in-18.

(a) Sulaymán probably flourished in the first half of the ninth century. The account of his travels in the Far East, written in 851, is the first Arabic account of China and of many of the coast lands of the Indian Ocean. It will no doubt interest the historian of civilization, and the more so that commercial relations between China and Islam had then reached their highest point (before being brutally interrupted by the sack of Canton in 878), but its geographical importance is small. Sulaymán records the the use of fingerprints as signatures by the Chinese.

(Contd. on the next page)

Unfortunately the first few pages of this manuscript are lost. It is true that the former proprietor of the volume in the hope of restoring it to its former value, has replaced the missing pages in the beginning, but this addition is entirely different from the original. Likewise, the title given in the beginning is also different. This title, *Salsalat al-Tawárīkh* or *Chain of Histories* does not bear any relation to the contents of the book, and one does not find it in the Arabic bibliographical works. A second discrepancy attracts notice in the course of the description. The real title of the book as it appears to me was *Akhbár al-Ṣín wa 'l-Hind.* that is to say because this, at least, is the title given in the beginning of the second part of the book, which we will discuss later on. I have not found any reference to this title in the Arabic bibliographical works.

In the same period, there flourished two persons who by virtue of the diversity of their knowledge have earned a celeberated position among the orientals. One of them is Abú Yúsuf Ya'qúb, better known by the surname of al-Kindí[a]

(*Contd. from next page*)

The accounts of the journeys of another traveller, Ibn Wahub who was in China in 870, was written by Abú-Zaid (see Ch. 7). From such voyages, gradually developed the series of narratives which have crystallised around the name of Sindbad the Sailor (see Ch. 8).

Besides Reinaud's *Relations des Voyages*, an excellent monograph is now available on Sulayman's voyages by Ferrand. (G. Ferrand: *Voyage de Sulayman suivi de remarques per Abu Zayd Hasan* : Traduction francaise, Paris 1922). An excellent new edition of Sulaymán's account has lately been published by M. J. Sauvaget with a French translation and accompanied by annotations. (*Relation de la Chine et de l'Inde* : اخبار الصين و الهند , Paris, 1948).

(a) Abú Yúsuf ibn Isháq al-Kindi who flourished in Baghdad under al Mámun and al-Mu'tasim and was persecuted during the orthodox reaction led by al Mutawakkil, died c. 873. He is known as "The philosopher of the Arabs" probably because he was the first and only great philosopher of Arab race. He was, as mentioned by Reinaud, an encyclopaedic scientist.

since he belonged to an Arab family of Kindá which had established itself in Central Arabia and which until the time of the Prophet had enjoyed some sort of sovereignty. His father had been the governor of Kúfá during the reign of Hárún al-Rashíd. After having lived for sometime in Baṣra, al-Kindí settled down in Baghdád where he devoted himself to the study of sciences. Mathematics, medicine, geometry, astronomy, philosophy, and even forensic astrology had attracted his attention. The knowledge which he had acquired in Persian, Indian and Greek languages put him in a position to draw upon diverse sources which were then at the disposal of his nation. Al-Ma'mún entrusted to him, as well as other scholars, the translation into Arabic of all the works which appeared to be of some interest. To al-Kindí are attributed more than two hundred works. It is he who translated from Greek the *Geography* of Ptolemy[1] and, as I have already remarked, this translation, which has never reached us, has unfortunately been confused by Abu'l-Fidá' with another book of a similar nature.[2]

Al-Mas'údí mentions a treatise of al-Kindí on tides. A pupil of al-Kindí, named Aḥmad son of al-Ṭayyib and surnamed al-Sarakhasí, since he originally belonged to the town of Sarakhs in Khorasan, wrote a book on seas and rivers, and

Cont. from last page

His treatise or treatises of geography carry different names ; for instance, Prince Yussouf Kamal mentions three:—

كتاب الكون فى الربع المعمور (2) كتاب في ابعاد مسافات اقاليم (1)

and (3) كتاب في الابعاديات . None of these books have reached us. *Monumenta Cartographica, v. 4.* Leiden, 1935.

Al-Kindi's book on tides entitled رسالة في المد و الجزر (Ms. Arch. A. 32 of the Bodleian Library) has been attributed by some authors to one of his pupils, al-Sarakhsí.

1 Dic. Bib. Kf under the head جغرافيا and *Bibliotheque de l'Escurial*, by Casiri, v. I, p. 349.

2 On al-Kindi, compare the *Bibliotheque de l'Escurial*, by Casiri v. I, p. 353 et seq, the *Relation d' Abd-Allatif* translated by Silvestre de Sacy, p. 487, and the History of Arabs by Abu 'l-Faraj, p. 273.

the history of lands etc., which was entitled *al-Masálik-wa 'l-Mamálik* or *The Routes and the Realms*. This work has been very much appreciated by al-Mas'údí [1].

The second of these personages is Ja'far, surnamed Abú-Ma'shar, or Albumazer as he was called in the Middle Ages. He was born in Balkh (in ancient Bactriana) in the year 190 A. H. (805) and died somewhere on the banks of the Tigris at the age of eighty. Primarily he applied himself to the study of *Hadith* or the Traditions of Muḥammad, but at the age of forty-seven he passed on to the study of the exact sciences and consequently to astronomy and forensic astrology. Astronomy was introduced to the Arabs simultaneously with astrology, on which subject certain Greek treatises attributed to Ptolemy had come within the reach of the Muslims, and these had upto this period the same status as his *Almagest* and *Geography*. Abú-Ma'shar is best known as an astrologer There exist many astrological treatises which bear his name and which have already been translated into Latin and other European languages. [a] Mention is also made of the *Astronomical Tables* prepared by him after careful observations. Abú-Ma'shar had also studied intensively the mathematical doctrines which were prevalent in Persia before the Muslim invasion and which constituted the elements in the formation of Arab science. He knew the Indian doctrines equally well and if one is to believe the author of *Á'ín-i-Akbari*, which was written in India in the later half of the 16th century, he had performed a voyage to the banks of the Ganges, to initiate himself into the sciences of the Brahmans[2]. Probably he applied the sum total of his knowledge in compiling his *Astro-*

1 Notices, v. VIII p. 156 Al-Mas'údi expresses himself slightly differently in M-DH, v. I. fol. 91 v. (see also the Dic. Bib. Kf. under المسالك والممالك).

2 *Á'ín i-Akbari* or *the Institutes of the Emperor Akbar*, London, 1800. Vol. II, p. 316.

a Abú-Ma'shar's treatise, *Kitab al-Mudkhil ila 'ilm ahkám al-nujúm* (*The Great Book of Introduction*) which was translated into Latin by Leon Hispalensi, contains an astrological theory of tides.

nomical Tables, of which we have only an incomplete idea. A proof of the fact that the writings of Abú-Ma'shar were not bound up entirely with the astrological or purely mathematical ideas, is that al-Mas'údí quotes from him, as will be seen later, on the monsoons of the Persian Gulf and the seas of India. [a] Unfortunately, these Tables, like the principal books of this period, have never reached us. [1]

About the middle of the 9th century, a man known for the diversity of languages which he could speak, named Sallám, and surnamed *al-Tarjumán* or the Interpreter, was commissioned by the Caliph al-Wáthiqbilláh to explore the regions situated to the north of the Volga, the Caspian Sea and the Jaxartes, i. e. beyond the limits of the conquests of the Muslim armies. He was especially charged with the search for the people of Gog and Magog of which there is a reference in the Bible as well as in the Qur'án. Sallám proceeded to Armenia and Georgia; he crossed the Caucasus and visited the Khazars, [b] who at this period formed a flourishing state. He went round the Caspian and advancing towards the Urals and the Altai, he had a chance to traverse the countries which had not been explored till modern times. Sallám returned to Mesopotamia via Bokhara and Khorasan. The account of Sallám has been preserved for us by al-Idrísí and others. [2] Unfortunately, it is overloaded with fabulous stories and from the very beginning it invoked the disbelief of the Muslims themselves. [3]

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1 On Abú-Ma'shar see Dic. Ibn Kh. v. I, p. 165 and the *Bibliotheque* of Casiri, v. I p. 351. See also Dic. Bib. Kf. under the heading, زيج أبي معشر (v. III, p 558)

2 French translation of al-Idrísí by M. Amédée Jaubert, vol II, p. 416 et seq.

3 D'Ohsson, *Des Peuples du Caucase*, Paris, 1828, p. 139.

a Abú-Ma'shar had a fairly good, if not very accurate, idea of the winds, tides and currents of the seas of the East. (Abú-Ma'shar: *al-Mudkhil al-Kabir*. MS. No A. 1501. Library of the Asiatic Society of Bengal, Calcutta, fol. 62). This knowledge was of great practical importance for the navigators of those days.

b Cf. *Hudúd*, pp 450-52.

A class of books which very much contributed to the Arabs' knowledge of foreign regions was based on the accounts of their first conquests whose rapidity and expanse were really astonishing, A large number of writings of this class were accomplished during the course of the 9th century. I may mention a book of an Imám of Baghdád, named Abu 'l-'Abbás Aḥmad and surnamed al-Baládhurí, who lived at the court of Caliph al-Mutawakkil and was incharge of the education of a prince of the Caliph's family. This work which is found in the Library of Leiden, bears the title of *A Book of Conquests of Lands.* [1a] The author treats successively the conquests of Syria, the Island of Cyprus, Mesopotamia, Armenia, Egypt, Africa, Spain, the islands of the Mediterranean Sea and Nubia. Finally, he passes on to the East and relates how the laws of the Qur'án were enforced within a short period in Persia, Transoxiana, and the countries watered by the Indus. He had taken care in interspersing his account with the details pertaining to the conditions of the conquered countries. He speaks also of certain cities founded by the Muslims, for instance, Kúfa, Basra and Baghdád, I have already published the chapter which deals with the occupation of the valley of the Indus by the Muslims. [2] Baládhurí died in the year 279 A. H. (892).

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1 كتاب فتوح البلدان

2 *Fragments arabes et persans inédits sur l'Inde*, p. 161 et seq.

a *Futúh al-Buldán*, edited by M. J. de Goeje, Ludguni Batavorum, 1866; English translation by P. Khurí Hitti and Francis C. Murgotten: *The Origins of the Islamic State*, 2 vols. New York, 1916-24.

5

IBN-KHURDADHBIH

The old World which had been the subject of the curious attention of the Greeks and the Romans, had been considerably enlarged. The disciples of Muḥammad and the people who lived under their protection, could go freely from the shores of the Atlantic Ocean to the Sea of Japan, from the peaks of the Atlas and the south of Arabia to the north of the Caucasus and the Jaxartes. The communications which were not only frequent but also regular had been fully established between the East and the West. The sea routes extended across the Mediterranean Sea and the Indian Ocean and the land routes passed through Syria, Persia, Transoxiana and Tartary. The Jews, who, since their captivity, did not belong to any country in particular, usually served as intermediaries. In England, in the Library at Oxford, [1] there is a description of the Muslim Provinces [2] by Abu 'l-Qásim 'Ubayd-Alláh ibn-Aḥmad, better

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1 *Oxford Catalogue of Oriental Manuscripts*, v. I, no. 993.

2 The title is كتاب المسالك والممالك

(Ibn-Khurdadhbih composed this work in about 846 in Samarra. This book which was probably revised in or after 885 is an important source for the historical topography of the Caliphate. It also contains abridged narrative of journeys in far off countries as the extract given by Reinaud will indicate. The text was edited with French translation and notes by C. Barbier de Meynard under the title, *Le livre des routes et des provinces*, in the *Journal Asiatique*, vol. 5, 1-127, 227-295, 446-532, 1850. A better text was published by M. de Goeje with French translation and notes, *B. G. A.* VI, Leiden, 1889....tr)

known by the Persian surname, Ibn-Khurdádhbih. This surname shows that the author was a descendant of a mage called Khurdádhbih; but, like many of his co-religionists, he embraced Islam and his grandson reached a high position. At first Director of Posts and Intelligence [1] in the Province of al-Jibál or ancient Media, he finally came in close contact with Caliph al-Mu'tamid about the year 880. He died in the year 300 A. H. (912). Ibn-Khurdádhbih, who by virtue of his position could appreciate things correctly, interested himself in the task of ascertaining the yields and taxes of each region, particularly of the valleys of the Tigris and the Euphrates, and also the distances between its principal cities and its most frequented routes. Unfortunately, as pointed out by al-Mas'údí, [2] the facts are presented by him in an insipid and incomplete manner. Moreover, the author when he sometimes enters into certain details, ordinarily makes allusion to some romantic legend. Here is, however, a valuable passage which indicates the manner in which Europe and Asia communicated with each other in the later half of the 9th century:

"The Jewish merchants[3] spoke Persian, Roman (Greek

1 الأخبار و البريد . See MS. arab. Bib. roy. anc. fonds, no. 874, *Kitáb al-Fihrist*, v. 1, fol. 202. See also the work of M. Fraehn, entitled *Ibn-Foszlan's Berichte*, p. XXI.

2 M-Dh. v. I, fol. 91 v.

(Al-Mas'údí, who gives the author's full name as 'Ubayd-Alláh b. Khurdádhbih, praises his big work on history and mentions his *al-Masálik wa 'l-Mamálik* as one of his excellent works (*Murúj*, vol. I, p. 13), although at another place he is critical of the latter saying that in *al-Masálik wa 'l-Mamálik*, the author has simply described the roads from one place another other and their distances. "He did not give any information regarding the kings or the countries. And there is no use simply knowing the distances and the routes, for those only concerned the expeditions and the carriers of maps and letters......However, it is an excellent book mentioned on this subject", *Murúj*, vol. II, pp. 70-71......tr.).

3 The Arab author gives to these Jews the epithet of الراذنية another Arab writer gives the name الرهدانية. The latter name is susceptible to signify 'connoisseurs of road', (Persian; راه + دان > داناية = road — expert. ....tr.).

and Latin), Arabic, the Frankish dialects, Spanish and Slav. They made voyages from the West to the East, and from the East to the West, by land as well as by sea. They brought from the West eunuchs, slave girls and boys, [1] furs, skins and swords. They embarked in the country of the Franks on the Occidental Sea and went to Faramá [2] where they put their merchandise on the backs of animals and travelled by land to Qulzum [3] about five days march to a distance of 20 parasangs. There they embarked on the Oriental Sea (the Red Sea) and went from Qulzum to Hijaz and Jedda; then they proceeded to Sind, India and China. On their return journey they brought musk, aloes, camphor, cinnamon, and other products of the lands of the East and returned to Qulzum then to Faramá, where they embarked again on the Occidental Sea. From here some went to Constantinople to sell their merchandise and others returned to the country of the Franks.

'Sometimes the Jewish merchants embarked on the Occidental Sea and proceeded up the Orontes to Antioch. At the end of three days' march they reached the banks of the Euphrates and arrived at Baghdád. There they embarked on the Tigris and descended down to Ubulla, [a] from where they took the boats for Oman, Sind, India and China. Thereafter the voyage could be performed without interruption

"The Russians who belonged to the Slav race came from the remotest corners of the vast land of the Slavs to the coast of the Sea of Rum (the Mediterranean) and traded in fox and

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1 On the trade of slaves in general and the eunuchs in particular, during the period in question, see my book on the Invasion of France by the Saracens, p. 233. et seq.

2 Near the ruins of ancient Poluse : G-A. v. II, p. 146. (In Egypt, on the shore of Lake Tinnis, amidst the sands of Jifár, Ḥudúd p. 151....tr.)

3 The northern end of the Red Sea. G-A, v. II, p. 161.

a Or Obullah. This town was situated a little north of Baṣra on the Tigris. It was a military cantonment and a commercial port in the Iranian days for ships coming from China and India.

beaver skins. The (Greek) Emperor[a] contented himself by taxing them to the extent of one-tenth of their merchandise. On another side, the Russian merchants sailed down the river of the Slavs (the Volga), and then down its arm that passed by the land of the Khazars (in the vicinity of present Astrakhan), where the king of that country taxed them with another tenth; from there they entered the Sea of Jurján (the Caspian) and then proceeded to their destinations. The diameter[1] of this sea is 500 parasangs. Sometimes the merchandise of the Russians was transported on camels from the city of Jurján[b] as far as Baghdád.

"Besides these voyages, journeys could also be made by land. The merchants who started from Spain and the country of the Franks proceeded to Tangier, from where they travelled towards the province of Africa and Egypt Then they proceeded towards Ramlah,[c] visited Damascus Kúfa, Baghdád and Basra, penetrated into Ahwáz,[d] Fáris Kirmán,[e] and Sind and thus arrived in India and China.

"One could also take the alternative route through Germany[2] across the country of the Slavs to the city of the Khazars; then after crossing the Sea of Jurján, one could reach Balkh in Transoxiana, the land of Toghuzghuz[3] and

1 G-A, v. II, p. 42 et seq.

2 The text gives : ارمنية or Armenia but I read it : الامانية

3 The country of the Toghuzghuz lay on the route which runs from Khorasan to China. It will be dealt with in the next section.

(On Toghuzghuz < Toquz-Oghuz, i. e. "The Nine (tribes of the Oghuz", see *Hudúd*, pp. 263-70......tr.).

a The Byzantine Emperor.

b In modern atlases it is given as Gurgan, a small town about 1. miles east of Bunder Shah which is an Iranian port in the south-eastern corner of the Caspian Sea.

c Modern Ramle, three miles south of Lydda (Israel).

d The city of Ahwáz, capital of the province of Khuzistan (Iran has not yet lost its old importance. It is at present a flourishing tow and is the regional centre of the fertile South Western Plain of Ira which forms the immediate hinterland of Abadan and Bunder Shapur It is a rail, road and river junction and also possesses an air-field.

e Fáris (modern Fars) and Kirmán are even at present two important provinces of Southern Iran.

China". [1]

Al-Mas'údí and al-Idrísí mention, among the geographical works of the later part of the 9th century, the treatises of Qudáma, surnamed Abu 'l-Faraj, and of Aḥmad, son of Abú Ya'qúb, surnamed *al-Kátib* or the Writer.

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1 This passage, which throws light on the route taken by the deputies sent by the Anglo-Saxon King, Alfred the Great, for communicating with the Christians of Saint Thomas in Southern India, has been published by Dr. Sprenger in the *Journal of the Asiatic Society of Bengal*, 1844, vol. 14, p. 519 et seq. M. Sprenger reports a passage from another book which exists in London in the British Museum and which appears to have been composed in the 4th century of Hijra (10th century). It is entitled كتاب البلدان or *A Book of Lands*. It is mentioned in this book that the city of Rei (which is the Rages of Scriptures and which is situated in the south of the Caspian Sea near about Tehran) was the meeting place for the merchants of Armenia, Azerbaijan, Khorasan, those of the lands of the Khazars and of the lands of Burjáns [Danubian Bulghars, see *Ḥudúd*, p. 423......tr.] (in the environs of the Danube) with the merchants of the West, who embarked on the Caspian Sea and disembarked at Jurján, transporting their merchandise to Rei, which developed into a world market. M. Fraehn cites a passage analogous to this from the *Geographical Dictionary* of Yáqút in his memoir, entitled *De Musei Sprewitziani numis Kuficis*, St. Petersburg, 1825, p. 92. On the Anglo-Saxon mission of 883, see the Saxon Chronicles as well as Guillaume Malmesbury's *De gestis regum anglorum*, p. 44.

[Rei (pronounced like English *Ray*) is at present a vast heap of ruins, six miles south east of Tehran. It once formed the city of Ragha or Rages, the metropolis of ancient Media and one of the oldest centres of civilization in Iran.

According to Bible, Rages must have been a flourishing city in the eighth and seventh centuries B. C., since the books of Tobit and Judith mention it as an important contemporary of Ninevah and Ecbatana. The Avesta twice alludes to Rei in connection with Zoroaster's name and tradition makes Rei the home of his mother. The Old Persian inscriptions speak of the district and city of Rages and the Greek and Roman classics refer it in connection with Alexander and his successors. The later Persian and Arabic writings have much to say of its importance, one of its claim to renown being the fact that Harún al-Rashíd was born at Rei in 763. With a fair degree of completeness we can trace its annals down to the 15th century, by which time it appears to have fallen into its final decay, as Clavigo, the Spanish ambassador to the court of Tímúr Lang, in 1404 describes it as 'a great city all in ruins'...............tr.]

Qudáma was of Christian origin, but he embraced Islam and occupied a high position in the administrative department at Baghdád. He was the son of Ja'far who was equally well versed in literature and in the science of book-keeping. During his studies in the field of literature and philosophy, Qudáma carried book-keeping to such a state of perfection, that he could be regarded as its inventor. He wrote about the year 880 of our era; but he lived upto the year 337 A. H. (948). Among his other works, Qudáma wrote a book entitled *A Treatise on the Art of Clerkship*,[1] which became a manual for the employees of administration. This treatise included seven 'abodes'[2] or chapters and each 'abode' was subdivided into as many sections. This is probably the same treatise which carries the title of *A Book of Kharáj* or *Taxes*.[3] To this treatise appertains, without any doubt, an incomplete volume which is preserved.in Constantinople in the Köprülü Library and which M. Baron de Slane has mentioned for the first time. This volume gives, first of all, a review of the war office, the treasury, the secretariat etc. and then describes the models of registers and the diplomas of investiture; then the author gives an account of the different postal routes of the Empire with their stages and their distances;[a] he mentions the revenues in kind and cash provided by each province and in passing refers briefly to the revenues of Persia before the Muslim conquest. Finally, one finds an account of the frontiers of the

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1 كتاب صناعة الكتابة

2 منزلة (Reinaud translated it as 'demeures' in French......tr.)

3 كتاب الخراج

(M. J. de Goeje translated into French and edited Qudáma's treatise in 1889 under the title, *Excerpta e Kitáb al-Kharáj* with notes and a glossery at the end of his edition of Ibn-Khurdádhbih in B. G. A. VI, Leiden......tr.).

(a) This part of the book follows the typical pattern of Ibn-Khurdádhbih's road-book. There are, in all, four road-books which are complementary to each other, viz., the treatises of Ibn-Khurdádhbih, Ya'qúbí, Ibn-Rusta and Qudáma. Al-Jayhání's book is lost.

Empire, some general remarks regarding the various kinds of taxes and duties and a kind of bird's eye-view of the seas and mountains etc. A long chapter is devoted to the origin of civilization and the history of the early conquests of the Muslims. [1]

As regards Ahmad son of Abú-Ya'qúb, [a] the title of *Kátib* shows that he was also connected with administration. Now, what better way could there be of procuring useful information on the state of the provinces than taking part, even indirectly, in government affairs! Ahmad, it appears, originally belonged to Egypt; he flourished about the year 890. At St. Petersburg, there is a book of Ahmad, entitled *the Book of Countries* [2] in which the author remarks that right from his boyhood he had felt a definite inclination to study foreign lands and that he had even undertaken certain voyages. During the course of his voyages, he had prepared some geographical, topographical, statistical and historical notes. After having given a detailed description of the two capitals of the state of the 'Abbásid Caliphs of that period, namely Baghdád and Sámarra he gives an account, though briefly, of the major part of the Islamic lands. Like Ibn-Khurdádhbih, he proceeds to mention the

1. On Qudáma, see the commentary of M. Silvestre de Sacy on the *Seances de Hariri*, 2nd Edition, pp. 11 and 254; also the original commentary of Motharrezi (MS. Arab. of the Bib. roy. anc. fonds, no. 1589, fol. 43 v.). See also the *Kitáb al-Fihrist*, Vol. I, fol. 177 and the *Asiatic Journal* of the month of June, 1846, p. 587. The date of the death of Qudáma is fixed by Abu'l Mahásin in *al-Nujúm al-Záhira* (MS. Arab. Bib. roy, anc. fonds. no. 660, fol. 41).

2. كتاب البلدان (*Kitáb al-Buldán* See EI, Supp. p. 65.........tr).

(*a*) Ahmad ibn Abí Ya'qúb, (see Sarton, IH, Vol, I, p. 607); el-Mas'údí gives his name as Ahmad ibn Abí Ya'qúb al-Miṣrí, (Introduction to *Murúj*, vol. I). Sarton places Abí Ya'qúb in Armenia and Khorasan, while Reinaud and al-Mas'údí call him Egyptian. The name of his book given by Reinaud is *Kitáb al-Bilád* while the correct title is *Kitáb al-Buldán*, written by him in 278 A. H. (891) (B. G. A. VII). This work of Abú Ya'qúb was edited and published by Juynboll (Leiden, 1861); See also Barthold: *Turkistan down to the Mongol Invasion*, pp. 6, 7, GMS, 1928.

distances between its places and the principal routes. Besides this book, Aḥmad had written a history of the Province of Africa and also a history and description of Asia Minor. These two works which belong to a less known period never reached us. [1]

During this period the impulse given to mathematical sciences by the Caliph al-Ma'mún continued. The end of the 9th century and the beginning of the 10th century was signalised by the work of a man who was born to extend the limits of science. That man was Muḥammad son of Jábir commonly know to us by the name of al-Battání.

Muḥammad was born in Mesopotamia in a village called Battán in the vicinity of the city of Ḥarrán.[a] This is the reason why he is named al-Battání, a word which we have turned into *Albateny*. It is said that in ancient times, Ḥarrán had been the seat of a cult, which was related to stars and fire. This cult was known as Sabian. Al-Battání was a Sabian and in spite of tha fact that his name was Muḥammad, he passed all his life in the study of stars and died as an adherent of this religion. He took as his basis the *Almagest* of Ptolemy, but he determined with more precision what had not been done so far, the obliquity of the ecliptic, the eccentricity of the sun, its mean movement and the precession of the equinoxes. As for the trigonometrical processes, some examples of which are found for the first time in his works, he

1 *Bulletin de l'Académie impériale de Saint-Pétersbourg*, 1838, v. IV, p. 131, Memoirs of M. Fraehn. Aḥmad son of Ya'qúb is probably the same of whom al-Idrísí and al-Ma'súdí speak in their Preface.

(a) Harrán was situated on the banks of one of the tributaries of the Euphrates about 10 miles north of modern Raqqa (Syria). Harrán corresponded with old Carrhe, a city that gave birth to the Sabian sect which traced its origin to Abraham. Sabians claimed that Harrán was the first city built after the Deluge. Al-Battání belonged to this sect. Ibn Jábir who visited Harrán in 1184 mentions that the city was flourishing and contained a strong fort and a big mosque with nineteen entrances and a magnificent dome. The whole city was enclosed within a wall of about 1350 steps in length. The surrounding land was irrigated by a number of little canals.

probably followed only those which were commonly used in his time and, as I have said before, there is reason to believe that they were of Indian origin. [a] His *Astronomical Tables*, that have reached us, are available in the Library of Escurial. Platon of Tivoli, in the Middle Ages, made a Latin translation of the preface of the *Tables*, and this translation has been printed ; unfortunately it lacks exactitude. One would find in the following section a valuable passage of this preface, which I have re-established with the aid of the Arabic text. [1]

The school, to which al-Battání did so much honour, did not come to an end with him. [b] For quite a long time, the mathematicians and astronomers of the Sabian School were often referred to in oriental works.

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1. On al-Battání, compare the *Bibliothèque de l'Escurial* by Casiri, vol. I, p. 342; the Dic. Ibn. Kn. v. III, p. 324 and C-A, v. II, p. 258. Delambre has given a précis of the preface of al-Battání, after the Latin version, in his *History of Astronomy in the Middle Ages*. As regards the *Tables*, they are mentioned in Dic. Bib. Kf. vol. III, p. 568. See also Notices, v. VII, p. 154.

(a) Al-Battání had developed the fundamental relation between the sides and angles of a spherical triangle, i.e.

$$\cos a = \cos b \cos c + \sin b \sin c \cos A.$$

It is doubtful if the knowledge of spherical trigonometry had reached that stage in India in al-Battání's time or before that.

(b) Al-Battání, as appreciated by Reinaud, was one of the greatest astronomers of Islam. His main work is his astronomical treatise *Kitáb Zij al-Sábi'i*. He made astronomical observations of remarkable range and accuracy from 877 onwards. His *Tables* contain a catalogue of fixed stars for the year 880-81. He found that the longitude of the sun's apogee had increased by 16°47′ since Ptolemy ; that implied the discovery of the motion of the solar apsides and of a slow variation in the equation of time. He determined many astronomical coefficients with great accuracy; precession, 54·5″ a year ; inclination of the ecliptic, 23°35′ (Newcomb gives the value 23°34′ 54″ for the year 900). He proved the possibility of annular eclipses of the sun. He did not believe in the trepidation of the equinoxes. (Copernicus believed in it!)

C. A. Nallino published a monumental edition of the Arabic text from the Escurial MS. mentioned by Reinaud, with a Latin translation entitled : *al-Battani sine Albatenii Opus Astronomicum Arabice editum, Latine versum*, 3 vols. Milano, 1899-1907).

The 4th century A. H., the 10th century of our era, which was so prolific in voyages and books on descriptive geography, [a] brings to our notice, first of all, a wazir of the Samanid dynasty in Khorasan and Transoxiana. This wazir was named Abú 'Abd-Alláh Muḥammad son of Aḥmad and surnamed al-Jayhání since he originally belonged to the city of Jayhán in Khorasan. He entered into the service of Prince Isma'íl by the end of the 9th century and carried on his work under Aḥmad, son of Ismá'íl. In the year 301 A. H. (913), when the king was murdered by his servants, the wazir was entrusted with the government in the name of the heir Abu'l Ḥasan Naṣr who was then a minor [1]. Al-Jayhání, who had an ardent zeal for geography, profited by his high position and collected information regarding different regions of the world, particularly regarding countries adjacent to Khorasan. His practice was to collect around himself travellers and foreigners and to question them about the countries which they

1. Compare the testimonies of al-Mas'údí (Notices, v. VIII, p. 156), of Ibn al-Athir, *Kamil al-Tawarikh*, 301-2 A. H), and of Mirkhond (*Histoire des Samanides*, Edition of M. Defremery p. 131 et seq.).

(a) The geographical literary activity which had sprung up in Baghdad and its environs, gave birth in the 10th century, to a geographical school that deserves the name of classical. Reinaud has omitted to mention the father of this new school, Abú Zaid Aḥmad ibn Sahl al-Balkhí (d. 934), who had been in his younger days a pupil of al-Kindí at Baghdad, and composed at Balkh, in his old age, a book which is usually given the title of *Suwar al-Aqálím* (صور الاقاليم). This work was in all probability mainly an atlas, to which a short text was added. The original text of al-Balkhí is no longer extant, but it is incorporated in the geographical treatises of al-Iṣṭakhrí and Ibn Ḥauqal, and in a number of Persian manuscripts that contain translations of the early version of al-Iṣṭakhrí. The maps contained in the manuscripts of all the works give an adequate idea of the maps of al-Balkhí's atlas. This atlas has been styled *Islam Atlas* by K. Miller in his *Mappae Arabicae*. It consisted, in an established succession, of a world map, a map of the Indian Ocean, maps of the Maghrib, Egypt and Syria, a map of the Mediterranean and fourteen other maps of parts of the central and eastern Islamic world. The maps show no trace of a division into latitudinal climates; the word *Iqlím* is applied to each of the regions of which a map is given. (EI. vol. 1., 624, 1911, and suppl. p. 65, 1938.)

had visited, and then he went on to compare their statements with the most authentic accounts. The book which was written by his orders carried the title, *A Book of Routes for the Knowledge of Realms*,[1] and was distinguished by the abundance of details, from several other treatises of the same class which had preceded it. The author had collected much information on the valley of the Indus and Peninsular India. Al-Idrísí who often quotes it, probably derived from this source a number of remarks which are now no more attributed to him. As in the treatise of al-Idrísí, the countries were arranged in the order of seven climes. It seems, moreover, that the views of al-Jayhání on drafting his book were not purely scientific. The Peninsular India, the valley of the Indus, the range of Hindukush and the greater part of the present Afghanistan were then occupied by people plunged in the mist of Brahmanism and Buddhism.[2] Al-Jayhání, who apparently professed an ardent zeal for Islam, was eager to subdue these vast regions to the authority of the Qur'án, and in order to achieve this, which the Ghaznavid princes accomplished nearly a century later, he took care to indicate the proper resources of every country and the distinct advantages of its principal cities. He died before he could finish his work and the book was recast and abridged by Abú Bakar Aḥmad son of Muḥammad, originally belonging to the city of Hamdán and later known by the surname of 'son of Faqih.'[a] Probably the abridgment was responsible for the neglect of the original work.[3] Besides, al-Jayhání believed in the reveries of astrology and, according to an idea borrowed from the Greek books as adopted by many

1. كتاب المسالك في معرفة الممالك

2. This subject is further developed in my memoir on India.

3. The abridgement is mentioned by Abu'l-Fidá', G-A, v. II, p. 101.

(a) ابن الفقيه . The Persian geographer Abú Bakr b. Aḥmad b. Isḥáq al-Hamdání, better known as Ibn al-Faqíh wrote a book entitled, *Kitáb al-Buldán* or *A Book of Countries* which is often quoted by al-Muqaddasí and Yáqút. This book was probably an abridgement of al-Jayhání's work.

earlier geographers, he placed each clime under the influence of one of the seven planets. [1] [a]

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1. On the book of al-Jayhání, see Dic. Bib. Kf. under the heading المسالک و الممالک (On al-Jayhání, see W. Barthold, Turkestan etc., pp. 12-13, GMS, 1928; EI (Suppl.), Djughráfiyá, p. 65..............tr.)

(a) Another geographer of the same period who is often quoted by later writers is Ibn Seráfion who flourished in Iraq at the beginning of the 10th century. His account of the canals of Baghdad is very interesting and provides the basis for the reconstruction of the plan of that city. (*Journal of the Royal Asiatic Society*, pp. 1-76, 255-315, 1895).

AL-MAS'ÚDÍ

During the time when al-Jayhání was busy collecting material for his compilation, the Islamic Empire from India to the Atlantic Ocean and from the Caspian to the Erythraean Sea was travelled by one of his co-religionists, al-Mas'údí. Abu'l-Ḥasan 'Alí son of Ḥusain, born at Baghdád, was surnamed al-Mas'údí because he had amongst his ancestors a resident of Mecca called Mas'úd whose eldest son had accompanied the Prophet in his flight to Medina. The year of al-Mas'údí's birth is not known and all we know is that he left his home at an early age and that his death occurred in the year 345 A. H. (956).

The greater part of al-Mas'údí's life was spent in voyages and he visited the regions which no other Arab writer had ever described. He compared himself to the sun from which nothing escapes in its course, and he applied to himself certain verses of the poet Abú-Tammám which convey the following sense :

"I have gone so far towards the Occident that I lost even the memory of the Orient and my journey carried me so far to the Orient that I have forgotten name of the Occident. I have been exposed to a

of dangers, and have come forth all covered with wounds as if I had been attacked by a band of enemies." [1]

Al-Mas'údí made successive journeys to Persia, India, Ceylon, Transoxiana, Armenia, the coast of the Caspian Sea, Egypt and to different parts of Africa, Spain and the Greek Empire. Furthermore, it can be deduced from some passages of his writings that he had navigated in the Seas of Malaysia and China [2]. In 303 A. H. (915) he reached the city of Baṣra and visited Iṣṭakhr, the ancient Persipolis; the following year he travelled in India from where he went to an island adjacent to Africa which he names as Qanbalú, and which appears to correspond to Madagascar. Finally he visited Oman and a part of Southern Arabia. In 304 A. H. (916) he went to Palestine and in 332 A.H. (943) he revisited Baṣra. It was in Egypt that he breathed his last. [3]

Al-Mas'údí was very well informed, not only in the Islamic sciences, but also in the souvenirs and vestiges of the ancients. History, geography, beliefs, superstitions and as a matter of fact nothing remained untouched by him. In every region which he visited, he scrutinized documents relating to the past and contacted well informed persons of those countries. For the later Arab writers his books served as an abundant source of information which has not as yet run dry. This was not because he was a specialist in any particular branch of knowledge or what one may call an expert in any profession. When he refers to the Greek writings, which he frequently came across, his references are to their

1 Not. Ext. Vol. VIII, p. 142.

فغربت حتى لم أجد ذكر مشرق وشرقت حتى قد نسيت المغاربا
خطوب اذا لاقيتهن رددنني جريحا كأني قد لقيت الكتائبا

Tanbih. ed. De Goeje, p. 7..... tr.]

M-DH. vol. I, fol. and 45 v.

appears that al-Mas'údí visited Zanzibar and did not go as
agascar. See the articles on al-Mas'údí's contribution to
rab Geography and on his Travels by S. Maqbul Ahmad in
, Vols. XXVII, No. 2, XXVIII, Nos. 1 and 4.

Arabic versions, which were numerous in his times.[1] Although he had paid special attention to the study of India and insisted on the novelty of his summaries, it is certain that he had not studied Sanskrit and confined himself to a mere reproduction of hearsay. I must, however, add that after having submitted his remarks on India to a very rigorous examination, I am in a position to assume that he had in general made a true exposition of narratives which were current in his times. It must be said, moreover, that the most important of his books is that which is entitled, '*Annals of Times,*'[2], and to which he continually refers in his other books. This book has never reached us.

Although al-Mas'údí had written much, he does not appear to have actually written a formal geographical treatise but all his writings furnish in greater or lesser measure some valuable facts for the geographer who could always consult them profitably. (In the book entitled *Murúj al-Dhahab* or *Meadows of Gold,*[3] al-Mas'údí examines and compares the opinions of ancient Greek, Indian and Sabian philosophers on the origin of the earth and describes the form and the dim sions of the globe. He gives the Arabic version of *Geography* which is now lost[4]. Finally he r

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1 The Caliph of Baghdád al-Qáhir (c. 318 interested in astrology. He had a large number books translated into Arabic. M-DH. Vol. II, f

2 اخبار الزمان . See Dic. Bib. Kf. v.

(On the various writings of al-Mas' *Islamic culture* Vol. XXVII, No. 2, Ap

3 مروج الذهب

4 Al-Mas'údí, M-DH (v. I. fol one of the ancient Greek kings of book which he published later (N I used in my researches is no. 714 which is in 2 volumes in 12°.

review the diverse regions of the world, and describes the people who inhabited them. His observations include regions from Galicia and the Pyrenees to China, and from the coast of Sofala [a] to the heart of Russia.

I must not forget to mention the sketch which al-Mas'údí has given of the Oriental seas, extending from the Persian Gulf to China. Like Sulaymán the Merchant, he divided the seas into seven sections which shows clearly that the narrative of Sulaymán was fully utilised by him. I have published elsewhere the text of this chapter from the *Meadows of Gold*, which I have utilised to fill in the lacunae in my *Relation*. [1]

In the preface the author, after having mentioned the titles of about 50 books which had served in the composition of his own book, says that this (book) formed a collection of all that an educated man must know. "There is no branch of science", he adds, "or any part of Muslim tradition which has not been treated either at length or at least in an abridg-
-d form". Then trying to 'seek protection against the
-iarists who were numerous in that period when printing
been invented and communication was difficult, he
who would lay their hands upon his work.
-osoever alters any thing in the meaning of
-ioves any column of its edifice, or destroys
landmarks, or conceals what has been
-laylight or attributes this book to any
-self, may he be struck by the wrath
of misfortune exhaust his patience
may God make him an example
to men of letters. He finishes
have put up this curse in the
of the book in order to deter
set himself to be driven to

Arabes et les Persans, v. II,

ar, corresponding to present

his evil destiny. He should fear God, his Lord and think of the time when he will have to leave this world; the span of life is short and the moment is not far off when he will have to appear before God".

The book, *Meadows of Gold*, is available in the principal libraries of Europe, and nowadays its translation in English is being published[1]. The book was written between the year 332 A. H. (943) and 336 A. H. The author gave, some years later, a revised and amended edition, but that edition has never reached us.

Besides *Meadows of Gold*, al-Mas'údí composed a treatise called, *The book of Indication and Admonition.*[2 a]. This book, of which a copy is preserved in the Royal Library of Paris, is a collection of observations on history, geography and philosophical doctrines. This was the last book written by al-Masúdí, since it carries the same date as that of his death. One finds in the preface of this book many interesting details of the literary works of al-Mas'údí. Here are some of its extracts :—

"We have written formerly a big book which had as its object, the narration of the 'history of the past centuries, of ancient peoples, the extinct generations and destroyed kingdoms'. It has been followed by a 'book of moderate

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1 *El-Massudi's historical encyclopaedia, Meadows of gold*, by M. Sprenger. Only the first volume has appeared uptil now and bears the he date 1841.

2 كتاب التنبيه والاشراف . M. Silvestre de Sacy has given a much elucidated and instructive note on this treatise in Notices, v. VIII, p. 132 et seq.

(a) Besides the editions of Silvestre de Sacy, Gildemeister and Sprenger mentioned by Reinaud, the text with French translation of l-Mas'údí's *Murúj* was edited by C. Barbier de Meynard and Pavet de Courteille (Paris, Société asiatique, 9 vols, 1861-1877). The *Tanbih* was edited by M. J. de Goeje (BGA. vol. 8, Leyden, 1894), and its French translation was published by Carra de Vaux (*Le livre de l'avertissement et de la revision,* Paris, 1896).

size',[a] on the same subject. Then comes the book whose title is *Meadows of Gold and Mines of Gems—a present to the most illustrious kings and learned men etc.* In these books we have described the events which have happened since the beginning of the world ; the history of distinguished peoples, for instance those of India and China, the Chaldaeans, the Persians, the Greeks, the Romans and others ; in it we have spoken about regions occupied by these various nations, the variety of their religions and beliefs; we have given an account of the seas which exist in the world, the places where they begin and where they end, those which are connected with others and those which are not, as well as those which have ebb and flow and those which do not ; the measurements of each one of these seas in length and breadth, the channels which carry the water of these seas and the rivers whose water they receive and the principal islands that exist in their midst. We have also indicated the diverse revolutions which the earth has gone through in the course of centuries, the opinion of philosophers of different nations on the youth and old age of the globe ; the largest rivers, their sources, their mouths and the lengths of their courses on the suface of the earth ; the figure of the earth and the theories of scholars of different nations including philosophers and others, on the extent of the habitable world and of that which is uninhabitable; on the mountains and lowlands, and the discussions which have taken place regarding the immobility of the earth. We have mentioned the influence which the stars exercise on the inhabitants, their variety of appearance, colour and inclination. We have described the seven climes, their extent in length and breadth and the extent of inhabitable regions in each ; the courses of planets, their respective disposition, kinds of their movements, their influence on all beings which are born or perish. We have examined if these stars exercise this influence by immediate contact or without contact, with intention and by voluntary act or involuntarily, how it

(a) كتاب الاوسط

happens and what is its cause. Are the movements of the spheres and all the celestial bodies natural and innate or free and voluntary? Do all these phenomena occur by virtue of physical cause which operates on all the things within its power and domain? We have remarked about the different countries of the world and the cardinal points on the horizon that is, the East, West, North and South; the marvellous edifices which exist on the surface of the earth; the period of existence of the universe, its beginning, its middle and its end; of the causes of longevity and factors which shorten life; the character of the authority of the different systems of polity or Government—royal or democratic; the duties of the king to himself and to his subjects, the different manners of dividing the temporal power and its component parts. We have told the reason why the royalty needs religion and reciprocally, why the religion needs royalty so that none of these two can be maintained without the help of the other; why that is necessary and what is the cause; how vices are introduced in the exercise of sovereign authority which cause the fall of dynasties and the destruction of laws and religion; what are the causes of destruction which are born within the temporal power itself and the religion and those which supervene from outside; what is the method of strengthening temporal power and religion; how one of these two things can revive and support the other. We have indicated the signs of the prosperity of an empire, the system of administration of territories, the religions and armies according to their different varieties; the ruses and strategems which are used in wars, and lastly a number of things pertaining to the history of the world and to the marvels which it contains. .....

"Now, it seems expedient to me to add to the preceding works [a] a treatise to which I give the title, *The Guide and the Gazette*. I shall add there, in an abridged form, matter about the planets and their disposition, the stars and their influence; the elements, their composition and their behaviour; of

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(a) [illegible] de [illegible]

the sequence of the seasons of the year, the signs of Zodiac which correspond to each season, the discussion regarding the season from which the year should commence and end, and other questions relevant to this subject; the winds, the place from where they blow, their effects and their influences; the earth, its figure, different opinions regarding its extent and its habitable portion; the different types of sea-shores and parts of the horizon, and the prominent features of each one of them as well as their influence on those who inhabit them and other objects which are found there; the distribution of the seven climes and their relation with the seven planets; the seven nations which existed in ancient times, their languages, their beliefs, the regions where they lived in and their distinguishing features etc. [1] This would be followed by the names of the kings of Persia belonging to the earlier dynasties and that of the Sásánids, marking these different sections and mentioning the number of princes in each one of them and the duration of each reign; the kings of the Greeks, their number and the period of their domination, those of the Romans, observing the different classes of these princes, pagans or Christians, their number, the duration of their reigns, the big events of Government or of religion which occurred in their times, the description of the provinces of their Empire, their limits, their extent, the countries which are in communication with their Empire which includes the lands of the Greeks and of the Khazars. We will elucidate, after that, the eras of different peoples, the chronology of the world, the prophets and kings from Adam to Muḥammad, the lunar and solar years used among different nations, their

1 These seven nations were, 1. the Persians; 2. the Chaldaeans; 3. the Romans, the Slavs and the Franks; 4. the Libyans, comprising the inhabitants of Egypt, Southern Arabia and Northern Africa; 5. the various Turkish tribes; 6. the people of India; 7. the Chinese and populations of similar origin. Each one of these peoples, according to al-Mas'údí, spoke the same language and owed allegiance to one king. (See Notices v. VIII p. 157 et seq.) The Roman Empire, according to al-Mas'údí, comprised the Greek Empire as well as the Western Latin Empire. (Cf. *Tanbih*, ed. de Goeje, pp. 5-6.......tr).

months, and their intercalations. We will insert there, information about the Persians, the cause of the grandeur of their Empire, its antiquity, the uninterrupted line of their kings, of the sagacity of their administration and the good order which distinguished their government, of the subordination (according to them) of the majority of the kings of the world who paid royalty and tribute to them. As for the Empire of the Greeks and that of the Romans, they are the only ones which approach nearest the Persians in grandeur and magnificence. They have also distinguished themselves in the culture of sciences, philosophy, the most exquisite arts and books of marvellous erudition. Besides, the Roman Empire has even today an existence which is sound and firm and its government is in all its vigour." [a]

Al-Mas'údí mentions in the *Book of Admonition* the treatise of Marinus of Tyre and also the maps which accompanied it.[1] He does not say whether that was the Greek text or an Arabic version. We understand that the Greek text is lost, and the book is known only through Ptolemy who made use of it. How regrettable it is that the treatise has never reached us and that we cannot ascertain exactly what it contained!

There is another book which bears the name of al-Mas'údí and which is not unknown to geography. This book is entitled in many manuscripts, *Kitāb al-'Ajā'ib*[2] or *The Book of Marvels*. The very title of the book reminds us of another treatise composed about a century earlier, by al-Jáḥiẓ and it also reveals analogy with other books written at a much later date. One finds in this book a series of remarks on the different constituents of the universe and on the manner in which, according to Roman and Muslim ideas, they had been

1 Notices, v. VIII. p. 147. (Cf. *Tanbih, ed. de Goeje,* p. 33.........tr)

2 كتاب العجائب

(*a*) Cf. original Arabic text in *Tanbih, ed. de Goeje* pp. 2-4 and 5-7. These extracts do not represent a faithful translation of the text of al-Mas'údí.

successively formed. Then follows a sketch of the oriental seas, the coasts which border them and the islands which they contain. This part, like the rest of the volume is surcharged with fables and shows that the author, in conformity with the title which he had chosen, had addressed himself to the task of collecting what was most likely to excite imagination. If this treatise be accepted as the work of al-Mas'údí, the irrational and the disorderly narration which characterizes the book, make me believe that it had been written in the youthful days of the author. However, even amidst the very absurd narratives, one comes across some genuine and curious details. I have published elsewhere a portion from this book. [1]

1 *Relation des voyages dans l'Inde et à la Chine*, v. II, p. 165 et seq. There are, in the Royal Library of Paris, many copies of *Kitáb-al-'Ajá'ib* but with different titles. The No. 901 (*ancien fonds arabe*) which is an old and good copy, carries the title of *Kitáb-Mukhtaṣar al-'Ajá'ib* or *Abridgement of the Book of Marvels.* In the No. 717 (Arabic supplement) the same book, equally old and a good copy, is entitled *Akhbár al-Zamán wa Ghará'ib al Baḥr wa'l-Umrán* i.e. *The Annals of Times and the Singularities of the Sea and the Habitable World.* This title distinguishes sufficiently the treatise in question from the book of al-Mas'údí entitled *Akhbár al-Zamán* of which we have already spoken, and it is evident that M. Pusey has confused the two books (*Catalogue of manuscriptz of Oxford* v. 2, p. 590). Lastly, in No. 955 (*ancien fonds arabe*), the *Kitáb al-'Ajá'ib* is attributed to Qazwíní, who is well known by his treatise of natural history. Al-Idrísí, whose authority is supreme in these matters, mentions in his preface, among the sources on which he has drawn, the *Kitáb al-'Ajá'ib* of al-Mas'údí, and I have found in No. 901 (*ancien fonds arabe*) and No. 717 (Arabic supplement) a large number of passages reported by al-Idrísí (see also Dic. Bib. Kf. v. IV, p. 188 and 187) but on the other hand al-Idrísí (vol. I of the French translation by M. Amédé Jaubert p. 88) mentions a treatise which also is called *Kitáb al-'Ajá'ib*, but is attributed to a writer named Hasan son of Mundhar. This further proves the prevailing practice that several writers, when dealing with matter included in books suiting the taste of the mass of readers, sometime kept the title of the book and the name of the author unchanged. (see Dic. Bib. Kf. under كتاب العجائب as well as the preface of MS. No. 903, *ancien fonds arabe*).

Continued from last page

(a) In the manuscript section of the Lytton Library, Muslim University, Aligarh, there is a MS entitled :

كتاب عجائب الدنيا للمسعودی و مافيها من الجزائر و العجائب و الملوک و الكهان و الأهرام و البرابی

This MS is dated 982A.H. At the end of the MS. the title of the book is given differently as كتاب العجائب . In *Kashf al-Zunún*, v. II, p. 107 (Cairo edition), there is a reference to a book of al-Mas'údí named عجائب الدنيا , but the full name of the author of this book is given as Muhammad b. Ḥusayn al-Mas'údí. The full name of the historian-geographer was Abu'l-Ḥasan 'Alí b. al-Ḥusayn al-Mas'údí. It may be that the name of al-Mas'údí has been wrongly recorded by the author of *Kashf al-Ẓunún*. The MS. deals with the following topics : The earth, its size and shape, oceans, seas and islands (pp. 1-47); an account of Adam, his son and other prophets till Noah; an account of various countries of the world etc. (pp. 48-101). marvels of Egypt and an account of the Kings of Egypt (pp. 101-323). عجائب الدنيا however, appears to be different from كتاب العجائب mentioned by Reinaud since the contents of the former book differ considerably from those given by Reinaud with respect to the latter.

7

ABU ZAYD

With al-Mas'údí's name is associated the name of an amateur geographer, Abú Zayd Ḥasan, who had some personal contact with him, and who is the author of the second part of the *Relation des vayages des Arabes et des Persans dans l'Inde et à la Chine*, the narrative about which I have already spoken [a]. Abú Zayd originally belonged to the city of Síráf, which was then a very busy port of Fársistan[b] on the shores of the Persian Gulf. So far as it is known, he had never been to India or China, and he owes all his accounts to persons who narrated them to him. He expresses himself very pointedly on this subject in the very beginning of his narrative, and he declares that his only object was to modify and complete the narrative of Sulaymán the merchant, with the help of what he had learnt in the course of his studies, and had gathered from persons who had voyaged in the oriental seas.[1] Abú Zayd is evidently the editor of the entire *Relation*.

Al-Mas'údí mentions, in *Murúj al-Dhahab*,[2] that once when he happened to be in Baṣra in the year 303 A. H.

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1 R-V. v. I, p. 61 and 153.

2 M-DH. v. I, fol. 62 v.

(a) See chapter 4 and footnote at the end of Chapter 6.

(b) The province of Fárs.

(916), he had the occasion to meet in that city a person named Abú Zayd Muḥammad, son of Yazíd and cousin of the governor of Síráf. Abú Zayd, whom al-Mas'údí describes as an intelligent and learned person, had left Síráf, his native land, for settling down in Baṣra—a city, which, though in those days, had foregone much of its ancient prosperity on account of the troubles which afflicted the Caliphate, had continued to be the meeting place of navigators. The author of the second part of the *Relation* calls himself Ḥasan, and al-Mas'údí refers here to a man called Muḥammed; but there is ample support to the presumption that both of these names refer to one and the same person. Al-Mas'údí mentions on this occasion the voyage made, forty years later, to India and China, by an Arab who lived in Baṣra and was named Ibn Wahab.[a] This Arab, unlike his compatriots, was not quite happy with his visit just to the coast of China. He wanted to visit the capital of the Empire as well, which was two month's distance by sea, and where he eventually got himself presented to the Emperor.[b] Al-Mas'údí begins by the remark

(*a*) al-Mas'údí mentions him as Ibn Habbár al-Qarashí (*Murúj*, v. I, pp. 312, 321); on contact between Abú Zayd and al-Mas'údí, see S. Maqbul Ahmad, Travels of Abu 'l-Hasan 'Alí b. al-Husayn al-Mas'údí, *Islamic Culture*, Vol. *XXVIII*, No. 4, Oct., 1954, pp. 522-24.

(*b*) In 651, China aud the Arab world made their first diplomatic contact: a mission was sent by the Caliph 'Uthmán to the Tang Emperor Kao Tsung. The Chinese dynastic history of this period contains a Chapter, *Records of Ta Shih*, describing the geography and products of the Arab world as well as further embassies sent to China in the seventh and eighth centuries—by the Caliphs Abu' l-'Abbás, Abú Ja'far and Hárún al-Rashíd.

Chinese chronicles mention no less then 37 Arab embassies and missions during the Tang era. Some, while diplomatic in name, were actually commercial. From the writings of the Arab merchant, Abú Zayd Hasan we learn that his companion Ibn Wahab came to the then Chinese Capital, Changan (the modern Sian). He had an audience with the Emperor Hsi Tsung, received sumptuons treatment and many gifts, and was accorded the special privilege of returning by post horse to Canton, which was then the terminus of Arab—Chinese commercial link and where the Arab population of China was concentrated.

that Ibn Wahab admits that he had seen Abú Zayd of Síráf, with whom he communicated during his tour. This is corroborated by a reference in the *Relation* where Abú Zayd says, among other things: "We questioned Ibn Wahab...etc."

It is thus obvious that Abú Zayd had furnished to al-Mas'údí a certain number of facts which are mentioned in *Murúj al-Dhahab*. It is also understood that al-Mas'údí, although Abú Zayd has never mentioned his name, did communicate to the latter many important observations. Abú Zayd speaks of a feat of magnificent courage performed by an Indian, who, before throwing himself into a blazing fire, pierced his heart with his dagger.[1] For this he invokes the testimony of a traveller, who was no other than al-Mas'údí, who states that he had witnessed this performance with his own eyes and adds to his narrative some other information.[2]

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1 R-V, p. 122.

2 M-DH. v. I, fol. 94. The scholar M. Quatremére who, for a long time, had the opportunity of examining the Arabic *Relation* and *Murúj al-Dhanab*, has given, on diverse occasions, opinion contrary to mine, in the *Journal Asiatique* of Jan. 1839, p. 22 et seq. Probably M. Quatremére wrote his memoir at a time when his memory was partly worn out. Nevertheless, M. Quatremére altered his views on the *Relation* in the *Journal des Savants* of the months of Sept., Nov., and Dec., 1846. That was the time when my book was published, but instead of studying the book with any fresh interest, more specially because India and China are much less familar to him than Egypt, Syria and Persia, he had only one object in view, and that was to find fault with what I had written. Moreover, he begins to overflew with contempt. I mention hereafter a few of his contemptuous remarks, and later on as occasion would permit, I would also cite his other remarks. He refers to the date of the voyage of Ibn Wahab to China as 872, and it was important to determine this date in order to be able to reconcile the narrative of this traveller with that of the Chinese writers (vol. 1 of the *Relation* p. CXVIII). On the other hand, al-Mas'údí reports that he visited Abú Zayd in the year 915, that is to say, about 40 years later. M. Quatremére (*Journal des Savants*, Dec. 1846, p. 742) supposes that I have placed the voyage of Ibn Wahab at the same time when Abú Zayd made the narration to al-Mas'údí.

Proceeding with his observations, Abú-Zayd says that in the period subsequent to the time when Sulaymán the merchant related his adventures, conditions in China were disturbed and the voyages to that country were not only slackened but were also interrupted. Further, he narrates a revolt which took place unexpectedly in the year 264 A.H. (878) and the flight of the Emperor from his capital, etc. This revolt, on which the Chinese historians have dwelt at length, brought about a revolution and raked a series of quarrels which made access to that country very difficult for the foreigners. Accordingly, the Arabs as well as the Persians almost entirely stopped their voyages to the Peninsula of Malacca, and this circumstance makes the *Relation* all the more valuable. The communications with China were re-established only in the later part of the 13th century when the Celestial Empire fell a prey to the descendants of Chingiz Khan and the Tartars became the masters of China and Persia for some time.

The narrative of Abú Zayd and the entire *Relation* ends with these words, "Such is the most interesting matter that I have heard, among the many accounts to which maritime adventure has given birth. I have abstained from reproducing the false narratives coined by the mariners, and which the narrators themselves do not believe. A faithful account, brief though it be, is the best of all. It is God who guides us in the right path".

In 1718, the Abbè Renaudot published a French translation of the Arabic work with the title, *Anciennes relations des Indes et de la Chine, de deux voyageurs mahométans qui y allérent dans le IX siécle de notre ére.* The translation was accompanied by a number of very interesting remarks; but some notes as well as the translation itself contained rather grave errors. Deguignes, who earned for himself a high reputation by his work on the Orient, published some remarks on the work of Renaudot in the *Journal des Savants* of the month of November, 1764. Much later, he returned to the same subject

again, in the first volume of the *Notices et extraits des manuscrits de la Bibliothéque royale*. The remarks of Deguignes include some important observations; but several of his remarks appear to be baseless, and only show that either Deguignes had read the manuscript very rapidly or that he had barely understood it. It therefore became necessary with the progress which oriental criticism has made in these later times, to submit the *Relation* itself to a fresh examination.

The starting point of such an examination was necessarily the publication of the Arabic text. The manuscript of the Bibliothèque, although unique, is not complete, and a number of pages are missing. The copy, though, in general, written in a clear hand, raises uncertainty in many places and there occur some expressions which introduce difficulties and obscure the subject matter. The late M. Langlès published the text in 1811, and although he died in 1824, he could neither revise the edition nor add a preface to it. This edition would still be found in the collection of the Royal Publications.[a]

I have revised the published text carefully, and it contains in the end a series of remarks which have arisen from the examination of the manuscript. Lastly, I have attempted to correct or complete what seemed inexact or missing in the manuscript, with the help of other books where the same subject matter is treated, particularly the works of al-Mas'údí. As the translation of Abbé Renaudot does not appear to me sufficiently exact, I have given a fresh one. My translation is accompanied by notes for which I have sometimes borrowed from the remarks of Renaudot and Deguignes; I have also used with profit the works of Klaproth. I have indicated the various sources very carefully.

(a) Imprimerie royale, Paris.

8

SINDBÁD THE SAILOR

I could not leave the *Relation des voyages des Arabes dans l'Inde et à la Chine*, without saying a few words about another narrative which is very much analogous to it, but which, by its romantic pattern and especially by the liberties which have been taken by its copyists, frequently presents contradictions which are difficult to reconcile. I am referring to the narrative of voyages by a person called Sindbád, who is supposed to have lived during the time of Caliph Hárún al-Rashíd, and who, urged by an insatiable curiosity, visited successively the Seas of Zanzibár, India and Malay. This narrative was recovered by Galland from an Arabic manuscript, and inserted in his beautiful translation of *Thousand and One Nights*. Later on, it was found again in the collective manuscripts of these charming tales, and since then it has been reproduced either in original,[1] or in different European languages.[2] It is certain that the narrative of

1 *Thousand and One Nights* in Arabic, ed. Calcutta, 1814, v. II; ed. of Breslau by M.M. Habicht and Fleischer, v. III, p. 357 et seq.; ed. of Cairo, v. II.

2 One finds in the Arabic Grammar of Savary a reproduction of the text of the voyages of Sindbád with a French translation and notes, by M. Langlés, Paris, 1813, in 4o. Among other versions in European languages, one may mention that which forms a part of the English translation of *Thousand and one Nights* by M. Lane, v, III. M. Langlés's edition contains a grave error (p. 474, line 9 et seq. of the edition in 4°). In place of the words, "We now embark upon the Oriental sea, bounded on the right by the *Gharb*, or the coast of Barbary", it should read "We now embark upon the Oriental sea, bounded on the right by Arabia"

Sindbád basically corresponds to the narrative of Sulaymán the merchant, and that of Abú Zayd; it also contains some details which are found in *Kitáb al-'Ajá'ib* [a]. Evidently, the points of view of these three books, in their romantic setting, are identical, but the manuscripts of the narrative of Sindbád differ considerably. The text which has been published by M. Langlès, and which reappears in the edition of *Thousand and One Nights* of Calcutta, includes more comprehensive geographical data than the text printed in Breslau and Cairo. It can, therefore, be concluded that the first compilation has been retouched by somebody who was thoroughly acquainted with scientific notions. However, variations were inevitable in works left to individual judgment particularly when their text was never fixed in a definite manner through the medium of the press.

To which period does the compilation of the voyages of Sindbád go back? In the following section [b] it would be seen that the Persians played a great part in the oriental navigation under the Arsacid and Sassanid kings. The author of *Mujmal al-Tawáríkh* mentions, among a number of books written in the time of Arsacid princes, a book called *Sindbád*. This passage has been borrowed from the treatise of Ḥamza of Isfahán, the text of which has recently been published in St. Petersburg.[1] Some scholars have deduced from this testimony that the narrative of Sindbád belongs to the time of Arsacid kings, except for the setting which was re-arranged later by the Arabs [2]; but al-Mas'údí, in his *Murúj al-Dhahab*[3], speaks of a work which gave, under the same title,

1 *Hamzae Ispahanensis annalium libri X*, by M. Gottwaldt, 1 vol. in 12°, p. 41. (For the *Mujmal* see the *Journal asiatique*, May 1843, p. 300; *Extraits du Modjmel*, by M. Mohl).

2 Mohl: *le Livre des Rois*, v. I, preface, p. LVIII.

3 This passage has been published by M. Silvestre de Sacy. Not. Ext., v. IX, p. 404.

(a) كتاب العجائب or the *Book of Marvels* by al-Masúdí. See footnote at the end of chapter 6.

(b) G. A. v. I. Introduction, § III.

the story of *Seven Sages* which is supposed to have been written earlier in India. The story in this book relates to a Chinese king, his seven wazirs, the queen, the son of the king and his preceptor.[1] Besides, in the evidence in question, provided by Ḥamza and the author of *Mujmal al-Tawárikh*, mention has been made at the same time, of Greek, Persian and Indian books. Thus, there is reason to believe that the book of *Sindbád* mentioned by Ḥamza and the author of *Mujmal*, have nothing in common with the voyages of Sindbád.

These considerations have led me to think that the book of the voyages of Sindbád is of Arabic origin, and that it is a reflection of the stories which were current among the Muslims of the Middle Ages. However, this book, despite its not very serious setting, has attracted, in later times, the attention of geographers. Richard Hole published, in 1797, in London a dissertation entitled *Remarks on the arabian nights' entertainments, in which the origin of Sindbad's voyages and other oriental fictions is particularly considered.* An illustrious geographer, M. Walckenaer, has written a memoir on the same subject, an extract of which appeared in 1832 in the *Nouvelles Annales des voyages.*

Yáqút, an Arab writer, who will be dealt with at length presently, mentions in his big *Geographical Dictionary* a person called Mis'ar Abú Dulaf, son of Muhalhil. In the year 331 A. H. (942), Mis'ar, on his return journey to his country, accompanied the deputies of the Emperor of China who were on their way to the court of the Sámánid Amír at Bokhara [a]. Mis'ar successively visited Tartary, China and India, and wrote a narrative of his travels, a large portion of which was reproduced by Yáqút in his *Dictionary*. Qazwíní,

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1 Loiseleur-Deslongchamps has given some interesting details of this book in his *Essai sur des fables indiennes*, Paris, 1838, p. 80 et seq.

(a) It appears from some sources that Mis'ar travelled to Southern India across Tibet with the embassy of the Hindu prince Kalatli, and came back by way of Kashmir, Afghanistan and Sijistán. A book named *'Ajá'ib al-Buldán*, which is a narrative of journeys to Eastern countries, is attributed to him.

who will be mentioned later in this section [a], has included some sections of the same narrative in his book called *Āthār al-Bilād*. Besides, the author of *Kitāb al-Fihrist*, who flourished in Baghdád in 377 A.H. (987), invokes many times the evidence of one Abú Dulaf who had visited India and who could be no other than Mis'ar; and he speaks of him as if he had known him personally. The narrative of Mis'ar should be particularly very interesting for us, as none of the Arab writings on Central Asia, which may have been written by an eye-witness, have ever reached us. But, as far as I can judge by some extracts of his narrative [b] which have come across my way, the testimony of Mis'ar does not merit much confidence.[1]

Some years before the time when it is supposed that Mis'ar traversed the northern regions of Asia, from the Oxus to the Oriental Sea, the Caliph of Baghdád (Muqtadir-Billah) sent an embassy to the King of the Bulgarians, who had just embraced Islam. The Bulgarians, referred to here, were those who had established themselves on the banks of the Volga, a little south of the confluence of the Volga and the Kama. They should not be confused with the Bulgarians of the Danube, who were then a terror even for the Emperors of Constantinople. The embassy started in 309 A.H. (921), and had in its train a writer named Aḥmad, son of Fadlán, who was a man of good faith and enlightenment, two qualities which rarely coincide in persons who have to introduce new regions to their compatriots. Aḥmad, during his travels on the banks of the Volga, had occasion to see some

1 Extracts from the narrative of Mis'ar (which have been preserved by Yáqút and Qazwíní) have been published by M. Kurd de Schloezer in Arabic and Latin under the title, *Abu-Dolef-Misaris-ben Mohalhal, de itinere asiatico commentarium*, Berlin, 1845. Mis'ar also wrote poetry and he is one of the poets who have been quoted by Thálibí in his *Yatīmat al-Dahr* (Man. ar. Bib. roy. no. 1406, fol. 313 v. et seq.)

(a) Chapter 16.

(b) For the French translation of the text, see G. Ferrand, *Relations des voyages arabes, persans et turcs*, Paris, 1913, Vol I, 208 fol.

Russians who travelled up and down the river. The Russians had not till then embraced Christianity, and were in a state of utter misery. There was little to indicate that they would ever be able to rise to their present status. Ibn Fadlán described their outer traits, their customs, and their arms with which they never parted. He speaks also of the manner in which their women dressed and the ornaments they used. They used to cover their breasts with cups of iron, copper, silver or gold according to the status of their husbands. These cups had a ring to which was suspended a dagger. The brutalities and the ill-treatment of the Russians surpassed all limits of imagination. "They are", says the traveller, "the dirtiest of men whom God ever created". Ibn Fadlán gives particular attention to their religious rituals. Beams, planted in the earth with human figures carved at their tops, were their divinities whom they worshipped and to whom they offered bread, meat, onions and intoxicating liquors. If any one among them fell ill, a tent was pitched for him at some lonely place, and he was transported there; he was left with some provisions of bread and water, and that was all the relief extended to him. If he healed, he returned himself, but if he succumbed, he was burned with the tent. In the case of a slave, however, the dead body was left for the beasts and birds of prey to feast upon.

Ibn Fadlán was particularly interested in the extraordinary ceremonies which were observed among the Russians at the funeral of big men. It was by chance that he happened to witness some of these spectacular ceremonies. On such occasions a male or a female slave of the house of the deceased was always sacrificed, and frequently enough the wives of the deceased would offer themselves as a sacrifice. Ibn Fadlán gives long details of the cruelties. and obscenities and the more bizarre incidents which accompanied these ceremonies.

The narrative of Ibn Fadlán [a] furnished still more valuable details about the Khazars who occupied the Volga delta,

(a) See also Ges. ar. Lit. v. I, 1898, p. 227.

and about the neighbouring populations. We will come back to them in the following section. [a] This narrative which was unknown to al-Mas'údí, was utilised by al-Iṣṭakhrí and Ibn Ḥawqal, and is probably lost today. We learn about it, however, through the extracts which Yáqút has inserted in his big *Geographical Dictionary*. [b] Science is under great obligation to M. Fraehn for having brought to light these extracts and for appending to them scholarly and comprehensive clarifications [1].

One sees how during this period the taste for voyages had become popular among the Arabs. Evidently one could travel much more easily in the Muslim countries than in the Christian lands. Religious intolerance was more intense among the Muslims than in the so-called Christian Republic of Europe, but the States were fragmented and the feudalities had not raised their innumerable barriers. A motive which carried certain Muslims outside their homes was the sudden burst of glory and splendour which their religion achieved even in far distant lands. How attractive, in fact, were such quick and absolute conquests ! Some Muslims wishing to feast their eyes upon the spectacle of such prodigious success, made it their business to go from one frontier of the Empire to the other in order to exhibit their laurels to the conquered nations.

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1 The work of M. Fraehn appeared in St. Petersburg in 1823, under the title, *Ibn-Fozlan's und anderer Araber Berichte über die Russen älterer Zeit* in 4°. M. Fraehn also published earlier in the Proceedings of the Academy of St. Petersburg, two other extracts of Ibn Fadlán, one on the Bashkirs and the other on the Khazars.

(a) G-A. vol. 1. Introduction § III.

(b) Ibn Fadlán's description of Russia is the earliest reliable account that of country and was almost completely included by Yáqút in his *Geographical Dictionary*.

9

AL-IṢṬAKHRÍ AND IBN-ḤAWQAL

I shall now proceed to mention two travellers, al-Iṣṭakhrí and ibn-Ḥawqal, who progressed on the lines of al-Mas'údí and whose accounts have reached us.

Sheikh Abú-Isḥáq was surnamed al-Iṣṭakhrí, since he originally belonged to the city of Iṣṭakhar, the old Persepolis. He was also surnamed al-Farsí after the name of the province of Fars to which Iṣṭakhar belonged. Al-Iṣṭakhrí travelled about the year 340 A. H. (951). He visited successively the different Muslim countries from India to the Atlantic and from the Sea of Persia to the Caspian. The treatise which he wrote, and which carries the title of *A Book of Climes*,[1] is purely descriptive and does not contain any reference to longitude or latitude [a]. He begins with Arabia, viewing it as the cradle of Islam, and the land of

1. كتاب الاقاليم

(a) Al-Iṣṭakhrí probably revised al-Balkhí's book, *Ṣuwar al-aqálím* (or *The Sketches of Climes*) which consisted chiefly of geographical maps. In his revision, al-Iṣṭakhrí added considerable information to the descriptive portion of the original book. Al-Iṣṭakhrí's compilation was in its turn revised again by Ibn-Hawqal who rewrote and republished it under his own name with a new title.

Ka'ba, a place which is every year the destination of Muslim pilgrims from all over the world. To each country is devoted one chapter of the treatise, and each chapter is accompanied by a coloured map. The descriptions are far from being rich as one would desire, the maps lack graduation and are not always free from confusion. Besides, a part of the narrative appears to have been borrowed from preceding treatises, which is the reason why one finds in his book the gist of the narrative of Ibn-Fadlán about the realm of the Khazars. Nevertheless, as this treatise surpasses, on the whole, all the known treatises of this class, it has served as the basis of many later books.[1]

Ibn-Ḥawqal whose real name was Muḥammad Abu'l Qásim was, like al-Mas'údi, a native of Baghdad. He himself tells us that from the very beginning he felt a passionate desire for studying books, particularly for reading the narratives of voyages. Nothing interested him so much as the description of customs and manners of the foreign peoples, the scientific accounts and products of the various countries of the world. This was the period when the successors of al-Manṣúr, Hárún al-Rashíd and al-Mámún had lost all their authority, and the capital itself, which had fallen under

1. M. Möeller has published, at Gotha, a facsimile edition of the treatise of al-Iṣṭakhrí, and of the maps which accompany it, from a manuscript of the Library of Gotha (*Liber Climatum*, 1839, in 4°). It is from this edition that I have translated the chapter devoted to the regions of Northern Europe and Asia (G.-A. v. II, p. 297 et seq). On the other hand, M. *Antonio Madini* published at Milan, an Italian version of the chapter on Sejisian. Lately, a German translation of the whole treatise by Mordtmann, appeared from Hamburg under the title, *das Buch der Leander*, 1845, in 4°. In the manuscipt of Gotha, some maps are missing, particularly the *general* map which depicts the Muslim countries as well as the rest of the *then* known world and which is indispensible for understanding the whole plan. I have traced all the maps of al-Iṣṭakhrí in a free translation, in Persian, of the treatise (MS. of the Bib. *roy. supple.* Pers. no. 58) and it is from this MS. that the facsimile (given here as *no.* 2) has been made. I shall discuss this map in the following section (G-A. vol. I. Int. § III).

power of the Turkish generals, was at the mercy of unruly soldiery.[1] Ibn-Ḥawqal, amidst such disorders, despoiled of a part of the fortune left to him by his cestors. Being still young and full of hope, he resolved leave his country and visit famous places, in order to isfy his natural inquisitiveness. Besides, he had always ihed to lead an independent life and to mend his fores by means of trade and commerce.[2]

Ibn-Ḥawqal left Baghdád in the month of Ramaḍán, A. H. (May 943) and visited successively the different intries of the world included within the orbit of the hority of the Qur'án. It does not appear that either or al-Iṣṭakhrí ever went outside the limits of Islamic intries. The Muslims, during all times, generally displayed ch repugnance to engage themselves in regions of alien ture. But we can understand that some of these regions re exposed to a rigorous climate and were unsuitable those born in a hot or even warm temperate climate. reover, the obligation of ablutions and of five prayers lay, in a strange land, imposed an enormous inconvenience 10st all the time.

All the travels of Ibn-Ḥawqal were made on foot or the back of animals. There is no reason to assume that ever took the risk of going far on sea. In 358 A. H. 8) he toured about the banks of the Tigris and the lowing year he went to Africa. He appears to have t the finishing touches to the compilation of his book 366 A. H. (976).

The treatise of Ibn-Ḥawqal is entitled *A Book of utes and Realms.*[3] The author says that, during his first

1. On the state of Caliphate in this epoch, see the memoirs of Defremery, on Amir-ul-'Omara' or Amir of Amirs (v. 2 of *recueil Savants étrangers* published by the Academie des inscriptions).

2. Uylenbroek, *Iracae persicoe descriptio*, pp. 80 and 81.

3. كتاب المسالك والممالك. [This treatise was edited by H. Kramers under the title كتاب صورة الارض, *Opus Geographicum*, ols., Leyden, 1938. ....Tr.]

excursions, he always had in his hands the treatises of Ibn Khurdádhbih, Qudáma and al-Jayháni. But then he begs the pardon of God for so secular a taste. "These are the books," he says, "which have diverted me from fitter and better studies which are more in harmony with the duties of religion". Meanwhile, while travelling in the valley of the Indus, he met al-Iṣṭakhrí, and the two travellers communicated to each other their observations. Ibn-Ḥawqal praises the exactitude with which al-Iṣṭakhrí had described the province of Fárs, his homeland, but he points out certain errors in the chapter on Sind. Al-Iṣṭakhrí, in his turn, admired the chapters devoted by Ibn-Ḥawqal to Ádharbaiján and Mesopotamia, but he discovered grave mistakes in the chapters on Egypt and Maghrib; then he adds, "I observe in thee a lucky star and marvellous qualities. Please be good enough to correct my book wheresoever it may appear defective to thee." Ibn-Ḥawqal took the manuscript of al Iṣṭakhrí and made many corrections in it. But later on he decided to publish a separate treatise [1] and started to revise his own narrative; he extended it and accompanied it, as al-Iṣṭakhrí had done, with geographical maps. "Earlier," he says "I was attached to the narrative of Qudáma; but then I omitted many of the passages borrowed from this author, not because the treatise of Qudáma was less excellent but because to develop a subject which has already been thoroughly developed seemed futile".[2]

The treatise of Qudáma has never reached us and it is impossible to know upto what extent Ibn-Ḥawqal has drawn on it. As regards the treatise of al-Iṣṭakhrí, one would be tempted to conclude from the statements of Ibn-Ḥawqal, that he has not only considerably improved upon it, but in his own writings he has also imposed upon himself the obliga-

1. Here I differ from the translation of M. Uylenbroek which has been adopted by M. Silvestre de Sacy (*Journal des Savants*, Jan. 1823, p. 25).

2. Uylenbroek, p. 58.

tion of not borrowing from it. This latter assertion seems to be without foundation. As a matter of fact, the treatise of Ibn-Ḥawqal is based on that of al-Iṣṭakhrī. In the two texts, there exists the same division of subject-matter and the same order of chapters; even the expressions are often identical. And yet, the style of Ibn-Ḥawqal is more developed and because of his literary pretensions he often employs a rythmic language which sometimes makes the meaning more difficult to understand.

Ibn-Ḥawqal remarks in his preface, "I have described the earth in length and breadth and I have written about the Muslim countries. I have not taken into consideration the climatic divisions, for such geometric divisions, howsoever exact they may be, are not free from confusion. Each particular region is accompanied by a map which gives its respective position. I have indicated the limits of each region, the cities and the districts included therein, the rivers which irrigate it, the bodies of water which modify the surface, the resources which are available, the various kinds of taxes which are imposed there, the routes which traverse it, the distances which separate it from adjacent countries, the type of commerce which is successfully carried on there; and to be brief, I have reassembled all the information which has made geography an interesting science for princes and persons of all classes. I have, besides, mentioned the names of the kings and princes of every country and have attempted to describe the more salient features of their lives. I have refrained, however, from entering into details for fear of making this book too voluminous".

The preface ends thus, "I have not described the country of the negroes of Africa, nor of those of Beja[1] and Zanj, nor of other people of the torrid zone, because the factors constituting a state are religion, education, laws and a regular government; and these people are deprived of these

1. G-A. v. II, p. 167 and 200.

advantages, and do not have any of the qualities necess
for forming a state in the proper sense. All that we co
say is that a part of the negro population, which is m
accessible to us, has adopted the knowledge and habits
the people with whom they have come in contact. It
due to this fact that the Nubians and Abyssinians
Christians, and follow the religion of the Romans. In f
the Nubians and Abyssinians, before the advent of Isla
were neighbours of Roman provinces.[1]

It has been seen that the treatise of al-Iṣṭakhrí form
the foundation of the work of Ibn-Ḥawqal, to such an ext
that there are, in the book of Ibn-Ḥawqal, passages wh
cannot be well understood without the help of the form
work.[2] But this is not the only reproduction of al-Iṣṭakhr
writings. There exists in the Bibliothèque royale of Pa
an anonymous volume which contains, with some interpo
tions, the writings of al-Iṣṭakhrí. It even includes ma
which accompanied the original treatise. The book is de
cated to Sayf al-Dawla, son of Hamadán, a prince who reign
in Aleppo in the later part of the 10th century. T
interpolations which have been made there consist
a table of taxes levied in principal Muslim countries
the time of Sayf al-Dawla. The other interpolations w
added in the early 12th century and even later. T
exhibit carries the date 349 A. H. (1445). Probably S

1. The Nubians had not renounced Christianity till the 1
century (G-A., v, II, p. 230). The chapter on Jebál or Pers
Iraq has been published M. Uylenbroek in his *Iracae Persicoe Desc*
tio. M. Gildemeister inserted a chapter on India in the first ed. of
work, *Scriptorum arabum de rebus indicis loci et opuscula*, Bo
1838. M. Amari has published in the *Journal asiatique* of Jan. 18
the chapter which treats Sicily in which Ibn-Hawqal speaks as a
witness. On the other side, M. le Baron de Slane has publishe
French translation of the chapter on Africa, in the *Journal asiati*
of March 1842.

2. For a remarkable example see G-A., v, II, p. 141 note
Al-Idrísí and Abu'l Fidá made use of both the treatises.

3. Anc. fon. arabe, no. 582.

al-Dawla got prepared a copy of the treatise of al-Iṣṭakhrí with some additions. Thereafter new additions were made at different times on the margin of the manuscript and later on some copyist in reproducing this manuscript, included these different additions in the text.

It is possible that some persons, deluded by the great reputation of al-Iṣṭakhrí and Ibn-Ḥawqal, thought of blending the two treatises. There exists, in the library of the Bologna University, an Arabic volume, accompanied by maps, which gives all at once the writings of the two authors free from the poetical expressions and bombastics of the latter. The number of chapters is the same and they are disposed in the same order. [1]

An edition, remodelled in this manner, was translated in Persian and this Persian edition was afterwards reproduced in English by the late William Ouseley, under the title of *The Oriental Geography of Ibn-Haucal*, London, 1800. Unfortunately, the copy on which M. Ouseley worked was very defective and the illustrious Silvestre de Sacy who rendered a detailed account of this publication in the *Magasin encyclopedique*,[2] did not have at his disposal either the Arabic text or a copy more accurate than the Persian version. Sometime later, Ouseley acquired a a copy of of the Persian version accompanied by maps [3], and used it for the narration of his travels in the East.[4] On the other hand, the Bibliothèque royale procured another copy from which I have borrowed the facsimile reproduced here. The title of the volume possessed by M. Ouseley is

1. This volume which bears the title خريدة العجائب is no. 1 of a catalogue compiled and published by Talman, but of which only two or three copies are known. The description which Talman gives of this volume is incorrect like one given by Assemani in his manuscript catalogue.

2. Vol. 16 of the 17th year.

3. No. 709 of his catalogue.

4. *Travels in various countries of the east*, v. 1, preface, p. XIX and 328 ; v, III, p. 554 et seq.

An Outline of Countries[1] while that of the copy of the Bibliothèque royale is *A Book of Routes and Realms.* [2] [a]

Whilst the voyages of al-Mas'údí, al-Iṣṭakhrí and Ibn-Ḥawqal were being undertaken, a new school of mathematicians was emerging in Persia in the city of Shíráz under the patronage of Buwayhid princes. 'Aḍud al-Dawla, one of these princes, had a particular liking for astronomy. He called to his court 'Abd al-Raḥmán, surnamed al-Ṣúfí or 'The Ṣúfí' because this scholar had adopted the life of a meditating friar, and another astronomer Abu 'l-Qásim 'Alí, surnamed Ibn al-'Álam. The first taught him the art of identifying the constellations and the second taught him the use of astronomical tables, that is to say, the calculation of the movements and positions of planets. 'Aḍud al-Dawla, while speaking of the various notions which he had acquired and of the masters to whom he was indebted, says: "The Ṣúfí has made me learn the names and the positions of the stars while Ibn al-'Álam has helped me in understanding the astronomical tables and Abu 'l-'Alí al-Fársí (name of a famous grammarian) has taught me to apply the principles of grammar.".

The principal book of al-Ṣúfí is entitled *A Book of Celestial Figures.*[3] It is dedicated to 'Aḍud al-Dawla for whom it appears to have been composed. The figures of constellations, forty-eight in number, their distribution in

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1. صور البلدان

2. كتاب مسالك ممالك

3. كتاب الصور السمائية

(a) In a library of Lucknow there is an old Arabic manuscript which appears to be a copy of Ibn-Ḥawqal's book under an unusual name. Although the manuscript carries the title, *Ashkál al-Bilád* or *Outline of Countries*, the text is almost verbatim the same as that of Ibn-Hawqal's *Book of Routes and Realms*. The text is accompanied by diagrams, one for each country but two of them are missing. The manuscript was copied in 589 A. H. and contains marginal notes by the copyist.

the zodiac belt, both above and below the ecliptic, and finally the list of known stars and their classification according to magnitude—all have been borrowed from the *Almagest* of Ptolemy. What is characteristic of this book and what makes it more valuable as a history of science, is the care the author has taken in establishing the synonyms of the denominations used by the ancient Arabs with those which were used by the astronomers of his own time. The Arabs of remote antiquity had learnt to give names to principal stars, but as one would see in the following section[a] they had, in doing so, yielded to certain superstitious ideas. These ideas were denounced by Muḥammad and they were soon obliterated or at least modified. However, what remained of the ancient doctrines, was scattered in poetic miscellany accessible to a few persons. Later, when astronomy took with the Arabs an exact form and when it became necessary to evolve a new nomenclature, a great part of these ancient traditions was already lost. The book of al-Ṣúfí is found in the principal libraries of Europe. [1 b]

1. M. Caussin de Perceval (senior) has published the preface of the book of al-Ṣúfí in v. XII of Not. Ext. On his side, M. Sédillot (senior) has left in manuscript a French translation of the catalogue of stars, collated from the three copies of the Bibliotheque royale, Paris.

(a) G-A. vol. II, § III.

(b) Al-Ṣúfí was one of the three distinguished Arab masters of astronomy ; the other two being Ibn-Yúnus and Ulugh Beg. His main work is the *Kitáb al-Kawákib al-thábita al-muṣawwar*, i.e. *The Book of Fixed Stars, illustrated by Figures.* Caussin translated its introduction. The French translation of the whole work was done later by Schjellrup (*Description des etioles fixes*, St. Petersburg, 1874). It is surprising that Reinaud was not much impressed by al-Ṣúfí's work, whose main contribution is in the field of observational astronomy. How much of it could at all be borrowed from Ptolemy is questionable. It is well established that the astronomical results were based on the independent field work of Arab scholars and trigonometrical calculations which they had developed since the time of al-Battání. Al-Ṣúfí's work shows a thorough grasp of the principles of astronomy, originality of method and precision in results.

Also see : EI, vol. 1, p. 57, 1908 ; Math. Ast. Ar, 62, 1900 ; and A. Hauber : *Zur Verbreitung des Astronomen Sufi, Der Islam* vol. 8, pp. 48-54, 1918.

Among the mathematician-astronomers of the first part of the 4th century A. H. (10th century), one cannot help noticing Muḥammed, surnamed al-Fárábí because he originally belonged to the city of Fáráb,[a] now Otrar, situated on the banks of the Jaxartes. A Turk by birth, al-Fárábí studied philosophy at Baghdád under a celebrated Christian doctor named Abú Bashar Matá, from whom we possess an Arabic translation of a part of the works of Aristotle.[1] At Ḥarrán, in Mesopotamia, he studied logic under a Christian physician named Jean.[2] Later, al-Fárábí went to Damascus and from there to Egypt. Finally, he returned to Damascus and died there in the year 339 A.H. (950). Al-Fárábí included in his writings almost the entire system of human sciences. He is especially famous for his philosophical works and his contemporaries regarded him as a man of greatest perspicacity since the time of Aristotle. He had also acquired a profound knowledge of music, which was a legacy left by the Greeks to the Byzantines and delivered on by the latter to the Arabs.[3] Lastly, among his great contributions are his *Astronomical Tables.* [4]

It is in this period, as far as I believe, that we can place the compilation of a work which Abu 'l-Fidá mentions on every page of his *Tables*, and on which it has not yet been possible for me to collect any positive information. This work is entitled *The Book of Longitudes and Latitudes*[5],

1. Wenrich: *De auctorum graecorum versionibus et commentariis*, p. 127. (See also the thesis of M. Flügel, p. 21.)

2. One of the many pupils of al-Fárábí was another Christian named Jean, son of Adi, who earned a celebrated position by his knowledge of logic. Ibid, p. 118.

3. This question has been treated in a special manner by M. Kosegarten, in the masterly preface of his edition of *Kitáb al-Aghání*.

4. On al-Fárábí, consult Casiri, *Bibliothéque de l'Escurial*, v. 1, p. 189; and Abu 'l-Fida, *Annales Muslemici*, v. 2, p. 456.

5. كتاب الاطوال و العروض

(a) or Páráb, 'a pleasant district situated by the Jaxartes. One of its chief places is Kadir. The people are warlike and courageous. It is a resort of merchants'. (*Ḥudúd*, p. 118).

and Abu 'l-Fidá appears to attribute it to an author named al-Fáris[1]. Now, judging from the passages which Abu'l-Fidá has borrowed, the book was not only confined to the longitude and latitude of principal places on the earth but also included somewhat lengthy descriptions. It is a compilation which was anterior to the *Qánún* of al-Bírúní, written about the year 1036, since it is said in the *Qánún* that *The Book of Longitudes* often transgressed from exactitude[2]. It is again, for a stronger reason, anterior to the foundation of Morocco which was laid in 1062, since Abu 'l-Fidá does not quote any paragraph on this city[3]. But on the other hand, we could be certain that it was written after the year 900, since it has mentioned the city of Al-Mahdíyya which was founded in 303 A H. (916)[4].

Petit de la Croix, who in the reign of Louis XIV accomplished a French translation of the Bibliographic Dictionary of Ḥájí Khalfa, which remained unpublished, and whose opinion in these matters carries weight, conjectured that the author of this book was no other than al-Fárábí[5]. If in place of al-Faris one could read al-Furs, which is possible in the absence of vowels, the title of the book would signify *The Book of Longitudes and Latitudes of the Persians*; then the point in question here would not be the name of the author but the school to which the work belongs, for example, the astronomical school founded at Shíráz by the Buwayhid princes.

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1. G-A, v. II, p. 97.

2. Dic. Bib. Kf. under كتاب الاطوال

3. G-A, v. II, p. 187. See the *Annals regum Mauritaniae*, ed. of Tornberg, p. 122.

4. G-A, v, II, p. 199, and C-A., v. II, p. 3?0.

5. This is at least the opinion of de la Roque, expressed by him in his translation of the chapter on Arabia from Abu 'l-Fidá's Geography. De la Roque communicated his work to Petis de la Croix. (See the chapter in question published at the end of *Voyage fait par ordre du roi Louis XIV dans la Palestine*, Paris, 1717, pp. III and IX.

Now turning from the East if we come to the West, in the heart of Spain, where the Arab civilization was blossoming in all its grandeur, we would find a curious specimen of scientific doctrines which prevailed in this beautiful country. These scientific doctrines were a mixture of Greek, Roman, Indian and Arab ideas—ideas which were then common to the Christians and the Muslims, not only in Spain but in good many other regions. This specimen is the Latin version of an Arabic almanac which was prepared in Cordova in 971 by a Christian Bishop named Harib, son of Zayd, who presented it to Ḥákim, the Caliph of Cordova, surnamed al-Mustanṣir Billáh or 'one who seeks the help of God'. The Arabic version which is mentioned by Ibn Sa'id[1] is not known to me; but the Latin version in found in a manuscript of the Bibliothèque royale, which has been published, for the first time, by M. Libri, along with other documentary evidence cited in the first volume of his *History of Mathematical Sciences in Italy*[2]. Unfortunately, M. Libri has neither identified the country of its origin nor the period when the book was written, nor the name of the prince to whom the author had paid homage. We have seen how by borrowing from different sources, scientific knowledge was naturalised by the Muslims who later on communicated their doctrines to the Christians of the West. But as the Greek ideas began to reassert their supremacy, particularly when Vasco de Gama had rounded the continent of Africa and Magellan had circumnavigated the world, new bases became necessary for science and these heterogeneous notions fell into oblivion.

The almanac of Cordova carries the Arabic title of *A Book of Ano* or, more exactly, *of Anwá*'[3] from the name of certain stars which, according to the ancient Arabs, wielded a great influence on the variations of the atmosphere.

1. Gayangos, *The History of the Mohammedan dynasties in Spain*, London, 1840, v. 1, pp. 189 and 482.

2. p. 393 et seq.

3. كتاب الانواء

I shall return to them in the following section[a]. In those days this was the title used for almanacs in all the provinces of the Muslim Empire.[1] As this was intended for the use of both Christians as well as the Muslims, it is accommodated to the solar year, which is indispensable for determining the sequence of seasons and agricultural activities. Not only the months are solar but the names of the months are also Roman. In Egypt, Coptic names were also given for the same purpose while in Syria the Syrian names were added.[2] In this almanac, the year begins from the month of January and use was made of the Spanish era, popularly known as the *era of copper*—an era which dates from 39 B.C. Such is the sense of the expression *era eris*, which is employed in this calender.[3]

Apart from dividing the year into twelve months, it is also marked by 28 mansions of the moon and to each month correspond two or three mansions. The division into lunar mansions is an Indian idea. I shall come to itagain in the following section.[b]

In indicating the time of the entry of the sun in each sign, the author had regard to the error which had

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1. For example, this was the title of an almanac prepared by Ibn Khurdádhbih. Casiri, with respect to a similar treatise, composed by Thábit (*Bibliothèque de l'Escurial*, v. 1. p. 388 and 391), translated badly the words "*Livre des Anoua*" to "*De sideribus corumque occasu ad artis naut'oae usum accomodatis*".

2. Al-Bírúní (manuscript of the *Bibliothéque de l'Arsenal*, fol. 127 v.) mentions a *Book of Anwá'* composed by Sinán son of Thábit according to the sequence of Syrian months and on the same system as the calender of Cordova (see also al-Bírúní's treatise, Bíb. roy. man. anc. fond, no. 56 et seq.).

3. p. 400 of the vol. of M. Libri, and G-A., vol II, p. 310. *Eris* stands for *Aeris*.

(a) G-A., vol. I, § III.

(b) Ibid.

been introduced in the calender at the time of the reform ordained by Julius Caesar. Due to this error, till the new reform came into force in 1582, under the Pope Gregory, one was behind time every year with reference to the movement of the sun.[a] In conformity with the results established in Baghdád, under the Caliph al-Ma'mún, and recorded in the two astronomical tables, one called *The Tested Tables* by Ḥabash and the other, *The Tested Argument* by Yaḥya, son of Abú Manṣúr, and then both modified by al-Battání who had determined the phenomenon of the precession of equinoxes with greater precision than before, the sun is considered (in this almanac) to enter each sign between the 15th and the 17th of a month. It also gives an Indian computation called *Sindhind*, sometime *Asind ind*, according to which the sun enters these signs a little later, between the 19th and the 24th. The sun enters the sign of Taurus on the 20th April, Gemini on the 22nd May, Cancer on the 23rd June, Leo on the 24th July, Virgo on the 23rd August and Libra on the 23rd Sept. These are the months during which the sun moves north of the ecliptic. On the 22nd October, the sun enters Scorpio, and the following signs on the 19th Nov., 21st December, 20th January and 19th February respectively and finally in the sign of Aries on the 20th March. These are the six months during which the sun moves south of the ecliptic. This difference arises from the fact, which had been pointed out by the Greek astronomers, that the sun, or rather the earth, during its annual revolution, stays for a longer time in the

(a) Julius Caesar with the help of an astronomer, Sosigenes, introduced the system of leap years. He suggested that one civil year in every four consecutive years should consist of 366 days. Also, (in 45 B. C.) the commencement of the year was shifted from March to January. This is called the Julian Calender. The month Quintilis was renamed as July (after the name of Julius) and the next month Sextilis was renamed as August, to humour Augustus, the successor of Julius. One day was cut off from February and added to August to give it the same status as July.

(Contd.)

northern hemisphere than in the southern.[1]

The end of the 10th century was marked by a new treatise of descriptive geography as well as by the work of two eminent astronomers.[a] The author of the geographical treatise was Ḥasan, son of Aḥmad, surnamed al-Muhallabí,

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The tropical year contains 365·2422 days. Thus according to the Julian Calender, 4 civil years will be in excess of 4 tropical years by ·0312 days, and 400 civil years will exceed 400 tropical years by 3·12 days. For example, in 325 A. D. the vernal equinox fell on March 21. Thereafter it occurred earlier every year and in 1582 A.D. in the time of Pope Gregory III it fell on the eleventh of March. Hence a subsequent correction was made by Pope Gregory III with the advice of the astronomer Clavius. He suggested that 3 leap years out of the 100 leap years in a period of 400 years must be converted into ordinary years, and this retrenchment was effected in the case of century years. Formerly all century years were considered as leap years, since they were divisible by 4. But, by this correction a century is not a leap year unless the number of the century is also divisible by 4.

1. For the commencement of the seasons, the author mentions Hippocrates and Galen. M. Darenberg in his *Choix des Oeuvres d'Hippocrate*, p. 475 and 476 agrees with Hippocrates and Galen, as regards the commencement of the seasons. Hippocrates just indicated the rising of certain stars while Galen mentioned the day of the month. For some expressions which are peculiar to the Arabs and are used in the almanac of Cordova, see the *Seances de Hariri*, with comments by M. de Sacy, 2nd. ed., pp. 215 and 295.

(a) To these must be added another famous work of this period, entitled *Fihrist al-'ulúm* or *Index of the Sciences* compiled by the great historian-bibliographer, Abu 'l-Faraj Muḥammad ibn Isḥáq ibn Abí Ya'qúb al-Nadím who died in 995. It is, according to him, "the index *of the books of all peoples, whereof somewhat exists in the language* and scripts of the Arabs, on all branches of knowledge ...... " together with the biographies and appreciations of the authors. Because of the sack of Baghdád in 1258, not one in a thousand of the books quoted by Nadím is extant, but *Fihrist* is a mine of information about Arabic literature, their authors and their biographies,

See *Fihrist*, 2 vols. ed. G. Flügel, Leipzig, 1871-72. The first volume contains the text and the second volume, notes and index. *There is no complete translation of the whole book. Some chapters* have, however, been translated, e.g. 7th chapter (Suter, 1892), 9th (Chwolsohn, 1856), 10th (Berthelot, 1893).

who flourished in Egypt at the court of the Fáṭimid Caliph 'Aziz Billáh. It carries the generic title of *A Book of Routes for determining the limits of Realms*.[1] Since it was compiled under the auspices of the Caliph himself, it is also called *al-'Azízí*[2] or *The 'Azízin*. This book was sometimes utilised by Abu 'l-Fidá. Unfortunately, it is not found in any of our libraries.

The two astronomers (mentioned above) were Abu'l-Wafá and Ibn Yúnus.

Abu 'l-Wafá Muḥammad is often mentioned with the title al-Búzjání because he was born in the city of Búzján, in Khorásán. He lived in Baghdád at the court of the 'Abbásid Caliphs and with the help of many astronomers he made some corrections in the *Verified Table*. The book which included the result of his labours carries the title of *The Collective Table*[3]—a title which as one would see, comes very close to the Greek name *Syntaxis* given earlier by Ptolemy to his *Almagest*.[a] The Arabs called it even by the name of *Almagest*, as if to establish new relations between this treatise and the book which contributed much to the reputation of the Alexandrian astronomer.[4] Unfortunately

1. كتاب المسالك فى بيان طرف الممالك
2. العزيزى
3. الزيج الشامل . Dic. Bib. Kf. v. III, p. 505.
4. Delambre has given in his *Histoire de l'astronomie du moyen age*, p. 156 et seq. a sketch of the works of Abu 'l-Wafá from the extracts supplied to him by the late M. Sedillot. Since then, M. Sedillot Jr. published a new extract in which he discovers the variation or third inequality of the moon, a phenomenon which was believed till now to have been discovered for the first time 600 years later by the famous Tycho-Brahe. The opinion of M. Sedillot Jr. has been challenged by M. Jean-Baptiste Biot who is convinced, and who appears to prove, that Abu 'l-Wafá had hardly improved upon Ptolemy on this problem. Besides, the manuscript of the Bib. royale, from which our scholars upto the present estimated the scientific works of Abu 'l-Wafá, is not complete. There is another copy in Florence, in the Library of Medicis (see the *Catalogue de Etienne-Evode Assemani*, Florence, 1742, p. 344, no. 289).

(a) Sarton gives the name : *Zíj al-Wadih* for Abu 'l-Wafá's *Tables*. (IH. vol. I, p. 112, 1908).

for Abu 'l-Wafá, his glory was a little obscured by that of Ibn Yúnus, his contemporary.

Abu 'l-Ḥasan 'Alí, better known by the surname of Ibn Yúnus or 'the son of Yúnus' from the name of his father, was born in Cairo towards the middle of the 10th century. His family had already had in its line able lawyers and distinguished writers. He lived at the court of the Fáṭimid Caliphs, 'Azíz Billáh and his son Ḥákim bi amr Alláh and made all his observations in Cairo and its environs. The work which contains his labours bears the title, *The Grand Table*[1], also called *The Ḥákimite Table*[2] after the name of Caliph al-Ḥákim to whom it was dedicated. The Arabs regarded it as the most important work of this class which had so far appeared in their language. Many observations made by Abu 'l-Wafá in that very period are not included in the *Table* but it gives a great number of other observations which are missing in the work of Abu 'l-Wafá.

The *Table* of Ibn Yúnus includes what is relevant to the making of observations, and to the calculation and use of not only the proper astronomical tables but also the chronological and trigonometrical tables which an astronomer has to consult frequently. His object was again to correct the tables drawn up earlier. This is how the author expresses himself in the preface[3]; "In the name of God, Most Gracious and Most Merciful. The study of celestial bodies is never irrelevant to the religion. This study alone can help in finding out the time of prayers, the time of daybreak when one who wants to fast should abstain from eating and drinking; the end of the evening twilight,

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1. الزيج الكبير

2. الزيج الحاكمي

3. Late M. Caussin de Perceval has given a long extract of Ibn Yúnus's *Table* in Not. Ext. v. VII. Late. M. Sedillot collected other extracts which have served Delambre for his *Histoire de l'Astronomie du moyen age*, p. 76 et seq. The passage given here will be found in Not. Ext., v. VII p. 76.

which is the time of the termination of fasts and religious obligations; times of eclipses, which one should know before hand to get ready for prayers which are obligatory on such occasions. This study, again, is always necessary for facing towards Ka'ba for praying; for determining the commencement of the months, for ascertaining certain doubtful days, the times of sowings, of sprouting of trees and of gathering fruits; for locating the position of a place in relation to another, and for keeping bearings while on journey.

"As the movement of the celestial bodies is also connected with many divine precepts, and the observations made in the time of Caliph al-Ma'mún are now quite out of date, and suffer from many errors like those made previously by Archemedes, Hipparchus, Ptolemy and others, our Master and Sire, Imám Ḥákim ordered a fresh observation of the celestial bodies which move fast (the Moon and Mercury) and of many others whose movement is slower (the five other planets)."

Ibn Yúnus died in the year 399 A.H. (1008).[a]

(a) There was another contemporary of Ibn Yúnus, named Buzurg b. Shahriyár (912–1009) who was a Persian sailor. He edited (c. 953) an interesting collection of sailors' tales about the lands of the Indian Ocean, which are often full of fantastic exaggerations but usually have some foundation of truth. The book is entitled *Kitáb 'Ajá'ib al-Hind* or *The Marvels of India*. (Ed. by P. A. van der Lith, Leyden, 1883-1886, with French translation by Marcel Devic).

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AL-BÍRÚNÍ

The fifth century A.H., the 11th century of our era, opens with the name of a person who accomplished prodigious works. He was Abu 'l-Rayḥán Muhammad who was surnamed al-Bírúní, probably because he or his family originally belonged to Bírún on the banks of the Indus.[a] Al-Bírúní passed his youth on the banks of the Oxus in the city of Khwárizm, whose prince professed ardent zeal for letters and sciences. It was from there that he knew the renowned Avicenna with whom he never ceased to maintain contact. In his studies he embraced almost the entire system of sciences : philosophy, mathematics, chronology, medicine and as a matter of fact nothing escaped his attention and he appears to have seen even the original Greek texts. He

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a. This is obviously incorrect. The source of this mistake is *Nushat al-arwáḥ* of Shams al-Dín Shahrzore (written in between 1190 and 1214) where he has mentioned these words : وبيرون مدينة بالسند This mistake was carried over by Abu'l-Fidá and other historians. In fact there was no town or settlement named Bírún in Sind although there was one called Nírún between Daybul and Manṣúra. Besides, al-Bírúní was born at Bírún in the vicinity of Khwárizm and he never visited India except when he travelled in the shadow of Maḥmúd's armies.

is given the sobriquet of *Muḥaqqiq* or 'Subtile' on account of the rigorous exactitude which is so characteristic of his deductions. His friend Avicenna himself had sometimes to complain of the severity of his criticism.[1] At the beginning of the 11th century, the famous Maḥmúd Ghaznaví, while preparing to cross the Indus for invading the classical land of the Brahmans, summoned scholars around himself, since he wanted them to initiate the Indian doctrines to the Muslims. Among the persons to whom he addressed himself were Avicenna and al-Bírúní. Avicenna who was very particular about an independent life, turned down the offer of Maḥmúd, but al-Bírúní was attracted by the new field which lay open before him, and he accepted the offer with eagerness.

Al-Bírúní crossed the Indus in the wake of the Muslim armies and contacted the scholars of that country. To his other attainments he added the knowledge of Sanskrit and translated certain Sanskrit treatises into Arabic. He also wrote some treatises in Arabic, which were translated into Sanskrit, in order to propagate the western doctrines in the peninsula. Abu'l-Faraj says in his Arab History[a] that al-Bírúní stayed for a good number of years in India, and that neither in his life time nor afterwards, there was seen a man more learned in astronomy than al-Bírúní.[2] It is regretted that we lack more precise information about his person and his works.[b] One only knows from

1. On the relations of al-Bírúní and Avicenna see *Les mines de l'Orient*. v. III, p. 167 et seq. (*Extraits du Habyb-alsyar de Khondémir* by Jourdain) as well as the manuscript treatise on eras by al-Bírúní, which is found in the Library of Arsenal, fol. 183. Also see Ges. ar. Nat., p. 75 and p. 13 of the Arabic text given at the end.

2. *Historia Orientalis*, ed. by Pococke, Arabic text, pp. 348-9.

(a) *Kitáb al-Aghání* (*The Book of Poets*) in 21 volumes.

(b) Al-Bírúní is one of those few Arab writers who have received considerable attention from the western orientalists during the later part of the 19th and early 20th century. This is mainly due to the

(*Contd.*)

his own remarks about himself, that he made astronomical observations in the cities of Ghazna, Kabul, Lámghán, Peshawar, Multán etc.[1] He was a witness to the conquest which the Muslims achieved over the city of Nagarkot situated at the foot of the Himalayas, and famous for an ancient idolators' temple.[2] Probably he penetrated, along with the soldiers of Maḥmúd, upto Mathura and Kanauj on the banks of the Jamuna and the Ganges respectively. He died in Ghazna in the year 430 A.H. (1039).

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fact that many of his old monographs were discovered and some of his classical works were translated into European languages in this period. Some important works are mentioned below :—

(i) Sachau, Edward. *Áthár al-Báqiya*, German transl.. Leipzig, 1878; Eng. transl, London, 1879.

(ii) Suter, H. *Bibliotheca Mathematica*, vol. II, 11-78, 1910. (*Kitáb istikhráj al-awtár fi'l dá'ira.........*).

(iii) Schoy, Carl. *Original Studien aus al-Qanun al-Masudi*, (Isis, V, 51-7; VI, 147; VII, 536; VIII, 739).

(iv) A number of papers published by Wiedemann in various German journals include shorter texts and extracts of al-Bírúní. Some of them, which are of geographical interest, are :—

Geographisches von al-Biruni (Biet. 27, Sitzungsber, Erlangen, vol. 44, 1-26, 1912).

Geographisches aus dem Mausdischen Kanon (Biet. 29, ibidem 119-126, 1912).

Uber die Dimension der Erde nach Muslimischen Gelehrten (Archiv. fur Gesch. der. Naturw. v. 3.)

(v) Fiorini, M. *Le projezioni cartographiche di Albiruni* (Bol. Soc. geografica Italiana [3] vol. 4,287-294, 1891).

(vi) Mittelberger (On Astrolabe), *Das Kugelformige Astrolab*, 1925, (Isis, VIII, p. 743).

(vii) Syed Hasan Barni; *Al-Bírúní. His life and works* (Urdu) M. U. Press, Aligarh, 1927.

(viii) Walidi, A. Z. (a) *Al-Biruni's Weltbild und Gradentabella*,
(b) *Neue Nachrichten aus Al-Biruni's Werker* (1935).

1. Man. ar. Bib. roy. suppl. no. 934, fol. 80.

2. *Journal asiatique*, Sept. 1844, p. 291, printed in part, under the title, *Fragments arabes et persans inedits relatifs a l'Inde*, p. 149).

Al-Bírúní has written a great number of books and has dwelt upon a great variety of subjects.[a] In Paris, in the Library of Arsenal, there is a treatise written by him on the eras used by different peoples. It is entitled, *The Vestiges of the Past.*[1] Rashíd al-Dín in his great book on the history of the Moghuls[b] has drawn on another book of al-Bírúní translated from Sanskrit into Arabic, under the original title of *Patanjali*, which contains a mass of information on India and China. This part of Rashíd al-Dín's work is not found in France, while his complete book written both in Arabic and Persian has been recently discovered in England.[2]

Among the works of al-Bírúní which have been on my disposal, one which has appeared to me to be the most

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1. كتاب الآثار الباقية عن القرون الخالية. See Dic. Bib. Kf., vol. 1, p. 154.

2. *The Journal of the Royal Asiatic Society of Great Britain*, no. XI, 2840, p. 11 et seq. and no. XIV, 1843, p. 267.

(a) A rough estimate of al-Bírúní's works may be made from the following:

(i) Al-Bírúní, at the age of 64 (i.e., 13 years before his death) on his retirement to Ghazna had written a pathetic letter to one of his friends in which he summarizes his life history and incidentally enumerates some of his own works (Barní: *Al-Bírúní*, p. 109). The total number of treatises mentioned by him in this letter are 113 (of which 19 pertain to India).

Sixty six of these treatises cover 13874 pages and some of the remaining 47 books are fairly voluminous since they include the *Qánún* and *Áthár al-báqiya*.

(ii) Treatises or monographs to which he himself refers in his well-known books, e.g. *Áthár al-báqiya* and *Kitáb al-Hind*, are 12 in number, 7 of which pertain to India.

(iii) Treatises of al-Bírúní mentioned by Ḥájí Khalfa in *Kashf al-Ẓunún* (not included in the above list)—12.

(iv) Al-Bírúní's other treatises known through *Irshád al-Aríb* of Yáqút al-Rúmí—7.

(v) From other sources—2.

Total books known—146

(b) *Jámi al-Tawáríkh.*

original, is a manuscript of the Bibliothèque royale which does not carry the name of the author, but which, as we know, was written in India, in the year 1031 of our era. This book gives a picture of the literary and scientific state of the Indian peninsula when the Muslim armies were penetrating the country for the first time. There appear in this book the principal literary, philosophical and astronomical contributions of the Indians[a]; the description of their eras; the manner in which they reckoned the days, the months, the year and the cycles.[1b] Some chapters of this treatise have been published by me in the *Journal asiatique* of Sept., 1844.[2]

But a book, which at present should have been of very great utility, is the treatise on general mathematical geography which al-Bírúní composed after the death of Sulṭán Maḥmúd and wherein he had probably summed up a great part of his previous writings. This treatise was dedicated to the son of Maḥmúd, named Mas'úd and consequently it bears the title of *Al-Qánún al-Mas'údí*[3] or *The Canon of Mas'úd.* Abu 'l-Fidá' many a time refers to it and gives the author the title of *Ustád* or "Master par excellence" for all that he wrote about the longitude and latitude of places as

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1. This treatise carries the title of تاريخ هند or the *History of India.* It is not mentioned in any Arabic bibliography and we are not quite sure if such had been its correct title. It formed a part of the Arabic suppl. no. 934. Another copy is found in Constantinople in the Köprülü Library and it is probaby from this copy that the copy of the Bib. royale has been made.

2. They are reproduced in my *Fragments arabes et persans inedits, relatifs à l'Inde.*

3. القانون المسعودی.

(a) See also Reinaud's memoir which was published under the title: *Memoire geographique sur l'Inde anterieurement au XIe siecle, Mem. Acad. des Inscription,* vol. 18 (2), 1—399, 1849.

(b) The treatise on India, entitled

كتاب ابى الريحان محمد بن احمد البيرونى تحقيق ما للهند الخ

was edited by Sachau (London, 1887). English translation of the same, with elaborate introduction and notes by the same author, (2 vols., London, 1888, reprinted 1910).

well as their respective distances[1]. In Oxford a part of the first volume is available, which contains the first six books of this treatise. Unfortunately this volume consists of the nature of prefatory matter. Here is the analysis of the volume in question[a].

The first book deals with days, months and years of principal peoples; the second book retraces their eras with the chronological chart of more important events from the creation of the world to 422 A.H. (1031). The third book presents elementary notions of trigonometry; the fourth, fifth and sixth books are devoted to astronomy. The meridian altitude of the sun is given for the latitude of Ghazna.[2]

There is a treatise of al-Bírúní on stones in the library of Esourial [3 b]. Some of his writings are on astrology as well,[4]

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1. G.A, vol. II, p. 96-97.

2. *Catalogue of Oriental Manuscripts of the Oxford Library*, vol. 2, p. 369.

3. *Bibliothèque de l'Escurial*, by Casiri, v. 1, p. 322. *Oxford catalogue*, v. 2, p. 585.

4. *Oxford Catalogue*, v. 1, p. 191 and 221; v. 2, p. 262; Dic. Bib. Kf, v. IV, p. 186.

(a) There are now at least six MSS. of *al-Qánún al-Mas'údí* available in various libraries, e.g. Bodleian, Oxford, Berlin, British Museum, Imperial Library (Calcutta), Lytton Library (Aligarh) and Mullah Firoz Library (Bombay). A complete edition of *al-Qánún* has now appeared in three volumes, published by the Dá'irat al-Ma'árif, Hyderabad Deccan (India), 1954-56. Besides, Reinaud has not mentioned another well-known work of al-Bírúní entitled *Kitáb al-Tafhím li-awá'il Siná'at al-tanjím* (written in 470/1029) which was also translated in Persian. Its Arabic and Persian versions are available in Berlin, and other libraries including Aligarh. *Kitáb al-Tafhím* has also been translated into English by R. Ramsay Wright, London, 1934. Zeki Valídí Togan has published from al-Bírúní's four works: (1) *al-Qánún al-Mas'údí*, (2) *Tahdíd niháyát al-amákin li-tashíh masáfát al-masákin*, (3) *al-Jamáhir fi 'l jawáhir*, and (4) *al-Saydana*, extracts pertaining to al-Bírúní's geographical conceptions and knowledge. This work is given the title, *Bírúní's Picture of the World* (*Sifat al-ma'múra 'ala 'l-Bírúní*), Memoirs of the Archaeological Survey of India, vol. No 53.

(b) Prof. Krenkow acquired a copy of al-Bírúní's work on precious stones through Zeki Valídí who discovered this MS. in the Sarai

(*Contd.*)

and this is apparently due to the fact that this learned writer, following the example of Ptolemy, considered it his duty to satisfy some of the popular notions, or may be, he depended on this for his livelihood !

Another book, composed during the reign of Maḥmúd, could be mentioned here in connection with the history of geography, but it furnishes information which is far from adequate. This is the Persian poem called *Sháhnáma*, or *The Book of Kings*. Firdausí, the author of this long poem, was born in Ṭús in Khorásán and since his earlier days he had a very strong liking for poetry. In this period, Maḥmúd who had a great literary taste, attempted to collect and bring to light those ancient Persian traditions which the Arab invasion and the progress of Islam had gradually affected and obscured. Firdausí particularly aimed at the reproduction of legends wl ·h were current in Persia and were used to be regarded in his e as a part of national traditions. The poem thus became a atural occasion for tracing the outline of knowledge, of institutions and even the geography of ancient Persia and the adjacent countries. Maḥmúd, for whom the poet wrote and at whose court he passed good many years of his life, should have been able, like many officers of his army, to procure plenty of correct information for him but the poetic genius of Firdausí aimed exclusively at the glorification of the Persian traditions and he simply wanted to adorn them with imaginative charms. The author, therefore, showed very little interest in establishing the veracity of facts; it even appears that he knew these facts only imperfectly.

Library in Istanbul. The learned professor has given a beautiful exposition of the chapter on Pearls from that book, in *Islamic Culture*. According to him, "No other work in Arabic or Persian of which I hav knowledge, treats the subject in such a scientific manner, anc as a rule other works make no pretence of investigating the specific weights, hardness and probable origin of the precious stones and minerals discussed", *Islamic Culture*, Hyderabad Dn., Oct. 1941, pp. 400-421). The *Kitáb al-Jamáhir fí ma'rifat al-jawáhir* has been publishec by the Dá'irat al-Ma'árif, Hyderabad, Deccan (India), 1355 A. H.

We know about the history of Cyrus and of oth Achaemenian rulers only through the Greek writings, that to say, through a people who, although very clever and genius, could never be wholly familiar with the point of vie of indigenous people. There is not a single Roman writ who would make it his job to present to us in a systemat manner the history of the Arsacid and Sássanid kings. the end of the 10th century the mass of the population Persia remained true to the cult of Zoroaster and conseque tly they preserved a part of their primitive traditions. O can be sure that Firdausí may not have aimed at reprodu ing these ancient traditions which had persisted upto th time. In the absence of evidence obtainable from the boo of the Guebers in which the chronological order is never pr perly established, we can mention the evidence of Mos of Khorène, an Armenian writer of the fifth century our era,[1] on the serpent of *Zuhák* and the fabulous e ploits of Rustam, and the evidences of the historia Ṭabarí[2] and of al-Mas'údí[3]. Indeed, Firdausí would have re dered a great service if, instead of enlarging upon tl narration of legends, he had applied facts to historic personages and to sufficiently definite rather than imag nary places.

Now, the truth is very difficult to establish; the ol traditions have been altered; the manuscripts of *Sháhnán* in the course of multiplication have undergone mutilatio and interpolations to such an extent that almost all tl copies differ from each other. How should then one asce tain the correct version of the book? I shall return t

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1. Edition of M. Levaillant de Florival, v. 1, p. 133 et se and p. 161.

2. *Chronique de Ṭabarí.* Translation of M. Dubeux, part p. 97 and 108.

3. M-DH, v. 1, fol. 37 v et seq; fol. 98 et seq. K. fol. 155.

Sháhnáma in the following section [1a].

1. There is a complete edition of *Sháhnáma* printed in Calcutta in 1829 with the help of a large number of manuscripts by a very learned person, Turner Macan, but Macan appears to have been rather a literary man than a professional scholar. In the end, to facilitate the reading of the poem, he has placed, in the form of a dictionary, a certain number of names of persons and places and beliefs which occur in the book and which are not commonly known. But he has confined himself to collecting what he found in *Burhán-qáṭi'* and *Farhang-Jehangírí*. He was neither keen to fill up the numerous lacunae or even to raise the frequent contradictions. The edition which is published in France is accompanied by a French translation. Moreover, M. Möhl, who is in charge, has announced his intention to publish later a series of notes and memoirs.

(a) Reinaud somehow missed two very important works which had a far reaching effect on the Arab scientific thought in the eleventh century. One of them is the wo k of *Ikhwán al-Ṣafá*, a secret association established at Baṣra about the end of the 10th century. Its aims were religious, philosophical and political; its tendencies Mu'tazilite and also Ismá'ílite. Their philosophy was an eclectic mysticism including Iranian, Christian, Hebraic, Syriac, Hindu, Arabic and Greek elements. Their knowledge of Greek philosophy was inferior to that exhibited by al-Kindí and al-Fárábí. To reconcile Greek science with the *Qur'án* they had to give mythical and mystical interpretations to both. They wrote a series of 53 monographs under the title *Rasá'il Ikhwán al-Ṣafá*, which were a collective work in which a number of prominent philosophers of the Eastern Caliphate collaborated. Seventeen of these monographs pertain to natural sciences which include physical and mathematical geography. A number of translations of the *Rasá'il* appeared in various languages after Reinaud's time:

Rasá'il Ikhwán al-Ṣafá. Text and translation by Fr. Dieterici, Leipzig, 1899.

Urdu translation by Maulvi 'Ali revised by Forbes and Rieu, London, 1861.

Other versions of *Ikhwán al-Ṣafá* although burnt as heretical by the orthodox clergy in Baghdád, spread as far as Spain where it influenced philosophic and scientific thought.

The other work of considerable geographical interest which was discovered in 1882 in Bukhára by Toumanski is *Ḥudúd al-'Álam*

(Contd.)

Ḥáji Khalfa, in his *Bibliographical Dictionary* mentions a book called *The Best Divisions for knowing the Climes*[1]. The author is Sheikh Shams al-Dín, son of Aḥmad, surnamed al-Muqaddasí, apparently because he originally belonged to Jerusalem. This book is unknown to me, but Ḥájí Khalfa, who wrote in Constantinople in the latter part of the 17th century was in possession of this book, and he acknowledges it, in the preface of his *Jihán-Numá*, among the treatises on which he had drawn.[2] He said that the copy which was available to him carried the date 414 A.H. (1023). The manuscripts differ on this point, and it is possible that the

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or *The Regions of the World* written in Persian by an anonymous writer in 982. An English translation of this book accompanied by an exhaustive commentary was published by V. Minorsky in 1937, in E. J. W. Gibb Memorial Series (New Series, No. 11).

In spite of the relatively insignificant size (39 folios) of the *Ḥudúd al-'Álam* as compared with the works of the Arab geographers of the tenth century, the author of *Ḥudúd* claims in his preface that it was meant to contain all data "that became known until then". To him all the lists which he has given regarding land features, seas and regions are absolutely complete. With the tendency towords completeness is connected a tendency towards numerical exactitude; the author tries to give preciso number of seas, salt and fresh water lakes, islands, etc. Judging from the Arab geographical works, the author is largely independent in his geographical generalization and terminology. For instance, he develops the idea of Seven Seas and gives new names to the oceans. The author's idea regarding the division of the world into continents (parts of the world) and countries is again original.

The book contains the following chapters:

1. Preface. 2. The disposition of the Earth: the amount of its cultivation and lack of cultivation and its countries. 5. The Seas. 4. The Islands. 5. The Mountains. 6. The Rivers. 7. The Deserts. 8. The Countries of the World. 9-60. One chapter for each country starting from the East to West then to North and finally to the South. 61. Epilogue.

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1. احسن التقاسيم في معرفة الاقاليم. Dic. Bib. Kf., v. 1, p. 167.

2. P. 8 of the printed edition of *Jihán-Numá*.

book may be of a more recent date.[1] However, this is what Ḥájí Khalfa says, "This is a precious book. The author has arranged it by states (and not according to the sequence of seven climes). It contains a general description of the world, the land, the seas, the mountains, the rivers and the mineral resources etc. The author says that his book was indispensable for travellers, and that the scholars as well as the officials could not do without it. He adds that prior to writing the book he had travelled in a number of countries and had measured several distances, while in the case of countries which he had not visited, he had consulted competent persons. He had reported only those facts on which he found there was general agreement, while he had rejected those on which there was divided opinion."[a]

For the later part of the 11th century one can mention Abu 'l-Ḥasan Koshyár, surnamed al-Jílí because he was born in Jíl or Gílan, and also 'Umar al-Khayyám or 'The Tent Maker', probably because one of his ancestors may have been in this profession. 'Umar had been the class-mate of Nizám al-Mulk who much later became the all-powerful wazír of the Saljúq Sulṭán, Malik Sháh. Nizám al-Mulk who had a great zeal for the advancement of sciences, placed 'Umar at the head of the observatory which he had founded; and entrusted him the task of reforming the calendar which was in vogue in Persia sometime before the Muslim invasion and which was not in harmony with the natural phenomena. The new calendar which appeared to certain scholars more perfect than ours, even after the reform of Gregory XIII, received

1. The date may be correct, if the author in question was the physician Abú 'Abd Alláh Muḥammad, son of Aḥmad, surnamed al-Muqaddasí, who flourished in the later part of the 10th century and of whom Ibn Abí Uṣaybi'a has mentioned in his *Arab Dictionary of Physicians* (see the *History of Arab Physicians* by M. Wüstenfeld, p. 57 and 143).

(a) The text of *Aḥsan al-Taqásím* was published in Leyden in 1877 by M. J. de Goeje in BGA. An English translation (incomplete) by Ranking and Azoo, was published by the Asiatic Soc. of Bengal, Calcutta, in 1910. See also Ges. ar. Lit., vol. 1, 1898, p. 230.

the title of *al-Jalâli* or *Jalâlian*, after the title of Jalál al-Dín, meaning 'the Dignity of Religion', carried by the Sulṭán. 'Umar executed many astronomical operations which must have indicated the state of science in that period. Unfortunately 'Umar combined with astronomy, a taste for poetry and pleasure. He does not appear to have attached much importance to the work which would have earned a glorious fame for him. His poetries have reached us but not the astronomical observations[a] which were conducted under his direction; the earlier oriental writers do not even appear to have a precise knowledge of them.[1]. The other astronomer, Koshyár, w.s the author of astronomical tables called, *Tables: General and Particular.*[2] These tables which are mentioned by Abu'l-Fidá' are available in the libraries of Leyden and Berlin. The Bibliothèque royale of Paris possesses a treatise on astrolabe by the same author[3].

During the time when mathematical geography was shedding its lustre in the East, it was also being developed in no less measure in the West. The Christian kings of Castille had established in the city of Toledo, recently conquered from the Muslims, an observatory which was run principally by Jewish and Muslim astronomers, who were

1. Compare C-A, v. III, p. 236 and 238, with the work of M. de Hammer called *Geschichte der schoenen Redekunste Persiens, etc.*, Vienna 1818, p. 80 and Notices, v. IX, p 141 et seq. The published text of C-A, mentions Ibrâhím al-Khayyám. The MSS. of the Bib. royale should read: *'Omar son of Ibrahim.*

2. الزيج الجامع و السالع . Dic. Bib. Kf. v. III. p. 563.

3. Supp. arabe, no. 1901.

(a) 'Umar al-Khayyám was also one of the greatest mathematicians of his time. His algebra contains geometric and algebraic solution of equations of the second degree and an admirable classification of equations including the cubic. He recognizes 13 different forms of cubic equations. Bionomial development and the study of postulates and generalities of Euclid are some of the problems he studied.

See Franz Woepcke, *L' algebra d'Omar Al-Khayyami*, Paris, 1851.
Math. Ast. Ar. (112, 225, 1900).
EI. vol. 1, p. 1006-7, 1912.

then more capable then the Christians. The most renowned of these astronomers was Abú Isḥáq Ibráhím, surnamed Ibn al-Zarqala, a designation which wes changed to Arzakhel in the Middle Ages. He was given the Arabic title of al-Naqqásh or 'The Painter', apparently because be added painting as well to his other branches of learning. Besides, the Arab writers associated his name with the title of al-Faqíh or 'The Man of Law', since he had studied Muslim jurisprudence along with mathematical sciences. Arzakhel made his first appearance in Toledo about the year 1675 of our era in the reign of al-Ma'mún, when this city was still under the control of the Muslims. Later on, he entered into the service of Muḥammad, son of 'Abbád, the ruler of Seville and then returned to Toledo. An Arab auther speaks with admiration of two reservoirs constructed by Arzakhel at Toledo, on the banks of the Tagus. These reservoirs got filled with water during the period of the waxing of the moon and emptied themselves proportionately with the waning of the moon.[1] His astronomical tables earned a great reputation in the Middle Ages; they were translated into Latin and some parts of it are available in the form of manuscripts. Besides, the name of Arzakhel is associated with the invention of a kind of metallic disc on which were reproduced the constellations and the principal circles of the celestial sphere which could be applied to astronomical operations. This disc carries the name of Ṣafíḥa[a] or 'Tablet' of which some models are available in the Bibliothèque royale.[2]

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1. Gayangos. *The History of the Mohammedan Dynasties in Spain,* London, v. 1, p. 81.

2. M. Sedillot Jr. has given the description of *Ṣafíḥa* in his memoirs on the astronomical instruments of the Arabs, p. 183 et seq. (*Recueil des Savants etranges* published by *Academie des inscription et belles-letters.* v. I.). For Arzakhal himself see the *Bibliothéque de l'Escurial* by Casiri v. 1. p. 393 and Gayangos: *The History of the Mohammedan Dynasties in Spain*" v. 1. 385. Ḥájí Khalfa has mentioned the astro-

(*Contd.*)

The Muslim Spain offers us, in the same period, an eminent name in descriptive geography. It is that of Abú 'Ubayd Alláh, son of 'Abd al-'Azíz better known by the surname of al-Bakrí because his family descended from an Arab tribe of Bakr, which has given its name to that part of Mesopotamia which is called Diyár Bakr or 'The Home of Bakr'. 'Abd al-'Azíz who was the father of this geographer, held an elevated rank in the service of the princes of Seville of the family of 'Abbád and governed in the name of these princes, the territory situated about the mouth of Guadiana and known as Saltes[1a]. Al-Bakrí after the death of his father and on the fall of the house of 'Abbád, retired to the city of Almeria where he performed the functions of Wazír. He died in 487 A. H.[2] (1094).

Al-Bakrí is the author of a geographic description of Spain and Africa, which is available in the Bibliothèque royale.[3] This description judged by the part available to us, is full of interest. It is not that the author had himself seen all the lands about which he speaks, but that he was well informed about what had been written before him. It is regrettable that European scholars possess only a portion of it. The title

nomical tables of Arzakhel in his Dic. Bib. under زيج المقتبس; v. 3, p. 568 et seq.

(a) صفيحة. An improved type of astrolabe. See A. Wittstein: *Uber die Wasseruhr und das Astrolabian des Arzachel* (Z. f. Math. vol. 39, 1894).

1. G-A, vol. II, p. 237.

2. Hamaker, *Specimen Catalogi*. p. 68; Gayangos, *The History of the Mohammedan Dynasties in Spain*, v. I, p. 313.

3. Ancien fonds arabe, no. 580. M. Quatremere has given a lengthy note on this narrative in Not. Ext. v. XII. This note which presented a number of difficulties, is made with care and offers some curious results. There are, however, certain number of points which the learned scholar does not clarify and which I would have done, had it been convenient to treat them here.

(a) Or Huelva.

of the book appears to have been *The Routes and the Realms*[1a].

We are also indebted to al-Bakrí for a geographical dictionary called *The Book which defines the Insignificant*[2]. One would, at first, be tempted to believe that he would find therein a treatise of general geography, but unfortunately the scope of the book is very restricted. It mentions only those places, the name of which are found in the Qur'án, Ḥadíth or the Traditions ofMuḥammad,ancient Arabic poetries and the narratives of earlier Muslim conquests. In the words of the author himself, "This book includes, in an alphabetical order, the bulk of place-names which occur in the Ḥadíth, the memoirs of ancient Arabs, the histories and pieces of verse, regarding the camping grounds[3], dwellings[4], market towns[5],

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1. المسالك و الممالك. It is under this title that the book is mentioned in the Dic. Bib. Kf. M, Pascual de Gayangos possesses an incomplete volume which carries the name of al-Bakrí with the title of المسالك و الممالك. This volume begins with the legend of Gog and Magog and treats successively Syria, Egypt, Persia, Armenia, Khazars, etc. But the facts are given there with little order and if this volume apportains really to al-Bakrí it has not been written with the same care as the part possessed by the Bib. roy.

2. كتاب معجم ما استعجم (Reinaud translated the title as follows: "The Book containing, in an alphabetic order, names which are not significant by themselves"...Tr)

3. المنازل

4. الديار

5. القرى

(a) Al-Bakrí's main work is partly lost. The part dealing with North Africa, Egypt and to some extent Spain are extant. The African part has been edited and translated by Baron de Slane (Algiers. 1857 and 1910). Kunik and von Rosen edited in Russian, fragments dealing with Russians and Slavs. (St. Petersburg, 1878) Also see: Ges. ar. Lit. (Vol. 1. 476, 1898) and EI. (vol. 1, 606, 1911).

(b) The Geographical Dictionary of al-Bakrí has been edited by F. Wüstenfeld (2 vols, Gottingen and Paris, 1876-77).

cities, mountains, monuments[1], water bodies,[2] wells, etc. As I felt that very often these names puzzle educated persons when they come across them in their reading, I have tried to explain them and have also given the pronunciation of each name. And, lastly, to facilitate research I have placed them in an alphabetical order." Following this plan, the book deals principally with Arabia and speaks of adjacent countries only occasionally. The author indicates the sources from which he has drawn; he reports even the verses wherein places are mentioned, if such places are known only by this particular type of reference. As the book includes only a few names of Spanish localities, one can deduce the well known fact that originally the conquering Muslims of Spain wrote little, and that the spirit of the poets themselves was frozen in the midst of cares of primary occupations and the anxiety of civil wars which characterized that period. The silence of the author about his own country is even more regrettable as he must have known it better than anybody else and we wish he could have elucidated certain points of information for us. At the end of the book there is a note covering three pages where the genus of Arab place-names is given. This question is more complicated than one would believe at the first instance. I shall return to this in the fourth section[3a].

For explaining the plan adopted by al-Bakrí, it is necessary to understand that the Arabs of the Peninsula, like those of other parts of the world, were very proud of their origin, and their spirits were continually turned towards the countries of their origin. Not only the emigrants spoke and wrote in their

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1. الآثار

2. المياه

3. The description with is given above is according to a copy which I have seen in the Bibliothéque Ambriosienne nos. 33, 34, and 35. This copy which is in three volumes in 4° is in old script and appears to have been copied in Spanish also; it is written in Maghribi script in which the letters of the alphabet are not disposed in the same order as in Egypt and Syria.

(a) G-A, v. I, § IV.

own national language but they also stuck to and expressed the same ideas as those of the Arabs of Arabia and they continued to develop their style in the manner of their ancestors. It is on account of this that the Arab writers of Spain made frequent allusions to the events and traditions of ancient Arabia. This naturally resulted in incongruity, and in general the poetry of the Spanish Arabs became less instructive, since they clung to ancient Arab traditions and all their ideas were secondhand. Moreover, they did not pay much attention to other countries and to the period in which they wrote.

To al-Bakrí is also attributed a book on plants and trees of Spain.

The beginning of the 12th century offers us a dictionary prepared on the same plan as that of al-Bakrí, by a writer who had probably never heard of al-Bakrí's work. This dictionary which is a less voluminous work, has for its author a man born at the other end of the Muslim world, that is to say, at Khwárizm. In the beginning he attempts to enable the Arabs of Spain to learn the names of places mentioned in the early monuments of national literature. He then addresses the Arabs scattered over Persia, Transoxiana and India, as well as those orientals, who, although they were not of Arab origin, would wish to acquint themselves with the ideas of the conquerors. The title of the dictionary is *The Book of Mountains, Places and Water-bodies.*[1b] The names which are indicated there are

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1. كتاب الجبال و الامكنة و المياه

(a) Before we close the eleventh century, mention may be made of a Persian *Safarnáma* or 'Account of Travels' (composed about 1045) by the well known Náṣir Khusro and the accounts deriving from Ibráhím al-Tartúshí (d. 1085) who travelled in France and Germany (quoted by al-Qazwíní). Both of these works have been overlooked by Reinaud.

Násir Khusro (1003-1088) was a renowned Persian poet and traveller. He was a Ismá'ílí missionary and was called the *Hujja* (Proof) of Khurásán. From 1045 to 1052 he

(Contd.)

sometimes accompanied with verses in which references have been made to them. Many of these names, as in the dictionary of al-Bakrí, do not have any importance by themselves and without their mention in some ancient poetry they would have remained unknown even in Arabia. Moreover, in the second dictionary, the names, in general, are not accompanied by any details, and one does not find them in any regular order. The author of this dictionary is Imám Abu 'l-Qásim Maḥmúd, better known as al-Zamakhsharí, after the name of his birth place. Al-Zamakhsharí who is particularly famous among the Muslims for his commentary of the Qur'án, studied at Bukhárá which had by then become the seat of scientific knowledge. Finally he made a pilgrimage to Mecca and by virtue of his stay for many years in the vicinity of Ka'ba he earned for himself the surname of *Jár Alláh*,[1] or 'The Neighbour of God'. Al-Zamakhsharí died in the year 538 A. H. (1144). He has composed very scholastic works on theology, philosophy and philology. He had made a particular study of the Arabic language and had read many of the ancient monuments of the Arabic literature which gave him the idea of compiling his dictionary.[2]

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travelled in Syria, Palestine, Egypt, Arabia and Persia and has left a diary of his journeys which contains a valuable account of life in Egypt and the adjoining regions in that period with varied geographic, ethnographic and archaeological information.

(See Guy Le Strange: *Diary of a Journey through Syria and Palestine*, London, 1888).

(b) This work was edited by M. Salverda de Grave and published under the title: *Lexicon geographicum*, Leyden, 1856.

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1. جار الله

2. On Al-Zamakhsharí see the *Specimen Catalogi* of Hamaker, p. 113 et seq. and the translation of Ibn Khallikán by M. de Slane v. III, p. 329 et seq. The Bib. roy, possesses a copy of al-Zamakhsharí's Geographical Dictionary made from the manuscript of Leyden (supp. arabe. no. 889).

11

SOME TYPICAL ARAB GEOGRAPHICAL WORKS

At this stage we may speak of two classes of works which occupy a prominent place in Arabic literature. They are typical in the sense that corresponding works are probably not found in any other literature. In Arabic, usually only the consonants are written while the vowels are suppressed. Hence the same word, according to the manner in which the vowels are supplied to it, may be pronounced differently, altering even the meaning of the word. Again, the same character, according to the diacritical points which accompany it, is susceptible to correspond to many different letters according as these points are above or below it. Usually the copyists omit the diacritical points or put them in such a confused manner that it is often very difficult to understand them. In an ordinary text the sense suffices to guide reading; but if it pertains to less known proper names or when the writing is not clear enough, the whole thing becomes puzzling. We can, therefore, understand the extent to which the technical sciences, for example geography, suffered from such an imperfect system of transcription. Out of this confusion there developed a regular art which is called, in Arabic,

that which differs in sense but resembles in form.[1]

There is also a second source of embarrassment. We have seen that the surnames, al-Zamakhshari al-Jayhání, al-F rsí, al-Khayyám etc. appear again and again. The Arabs do not have patrimonial names. Every individual is known by the name which he receives at his birth or his circumcision. As the number of these names is restricted, and in addition to that, certain names such as Muḥammad and 'Alí are very popular, they lead to further confusion. To remedy this inconvenience they thought it necessary to associate the name of a person with that of his father, for example, Ibn Yúnus or the son of Yúnus; or with that of his son, for example, Abú 'Alí or the father of 'Alí. But as time passed on, this method too was found to be insufficient to distinguish an individual with certainty. Recourse was therefore made to an epithet derived either from the place of birth or, in case of Arab origin, from the name of the tribe from which the man descended or by the trade or profession carried on by him or by one of his ancestors, or even from some physical quality of the person. This surname was often transmitted from father to son, and it turned, so to say, into a patrimonial name. Sometimes the surname or sobriquet obliterated the name itself, with the result that even for a distinguished person, well known by his surname, it became difficult to trace the origin of his ancestors. Besides, in the case of places, prolific in distinguished persons, like Baghdád, Bukhárá, etc. the surname derived from a place-name became so common that it was difficult to distinguish one person from the other. But this is not all; the surnames often had reference to facts of little or no importance or they corresponded to less known places; it was difficult even to read them if only the consonants were marked. Moreover many of these names, specially the place-names, in the process of giving rise to certain surnames, underwent some altera-

1. المختلف و المؤتلف. See Dic. Bib. Kf.

tions. For example, a man born in the city of Maiyáfáriqín,[a] to the east of the Tigris, was surnamed al-Fáriqí; or a man originally belonging to the city of Rei or old Rages, to the south of the Caspian Sea, carried the epithet of al-Rází. In case where one place-name was applicable to different places, the form varied for each place, e. g. a person born in a town of al-Jazíra[b] in the middle Tigris valley, was called al-Jazrí, while a man born in Spain in the city of Algezíra,[c] received the surname of al-Jazírí.[1] More than once, Abu'l-Fidá, after having given the description of a place, had to mention the alteration which had occurred in its name in the course of time.

The necessity of some kind of dictionaries where these different words were explained and traced to their origin had soon been felt. These dictionaries even dealt with individuals at some length, so that the personality of each one was clearly brought out. These treatises formed a species of science known as *ansáb*[2], a term which is the plural of *nasab*[3] and which corresponds very nearly to our word, 'origin'. We shall speak first of all about the books which pertain to the first group.

The earliest author whom Ibn Khallikán mentions in his *Biographic Dictionary*, [d] for the science of names which resemble each other in writing, but which apply to different objects, is Abu'l Ḥasan 'Alí, surnamed al-Dáraquṭní, who

1, G-A, v. II, p. 247.

2. انساب. See Dic. Bib. Kf., v. I, p. 454.

3. نسب

(a) In Anatolia. Probably the same as modern Silvan (38°N, 41°E) about 45 miles east of Diyárbakr.

(b) Northern Iraq i. e. the region between the Tigris and the Euphrates was called al-Jazíra by the Arabs. It was divided into three parts : (a) Diyár-Rabí'a (b) Diyár-Muḍar (c) Diyár Bakr i. e. the regions where the three tribes-Rabí'ya, Bakr and Muḍar had settled.

(c) Algeciras (36° 30′ N, 5°29′ E).

(d) *Wafiyát al-A'yán.*

flourished in Baghdád about the year 366 A. H. (976)[1]. A book similar to that of al-Dáraquṭní was composed in Egypt about 392 A. H. (1002) by Ḥáfiz 'Abd al-Ghaní.[2] The two books were blended together by Abú Bakr Aḥmad, surnamed al-Khaṭíb, the author of a history of Baghdád,[a] about the year 450 A. H. (1058)[3]. Abú Naṣr 'Alí, surnamed Ibn Maqúla, who came a little later revised the work of Abú Bakr, added some new articles and published the whole under the title of *The Complement.*[4]

The book of Ibn Maqúla has been utilised by Abu'l-Fidá. It is available in the Library of Escurial with the title, *Solution of difficulties on the subject of Names which resemble in Writing but differ in Sense.*[5] It is divided into four parts, each of which is arranged in an alphabetical order. The first part treats the books by their titles, in preference to the names of the authors, when the name of the author was either un-known or was uncertain. The second part is devoted to the authors who are known only by their surnames. In the third part mention is made of authors known by the names of their fathers or their sons, and lastly, the fourth part deals with those authors who are known by some sobriquet derived from a particular profession or by any other peculiarity. It has been remarked towards the end of the book that it was started in the year 464 A. H. (1071) and was finished in 467 A. H. (1074).[6]

Since its appearance, the treatise of Ibn Maqúla came to be regarded as a classical book. One and half century

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1. Dic. Kn., ed., M. de Slane, v. 1, p. 458.
2. Ibid. p. 424.
3. Ibid. p. 38.
4. الاكمال. Ibid. p. 461.
5. رفع الارتياب عن المؤتلف والمختلف فى الاسماء
6. Casiri, v. II, p. 28.

(a) *Ta'ríkh Baghdád.*

later, a supplement was added to it by Ibn Noctha[1], but there was no dearth of matter and consequently new treatises on the subject had appeared in this interval and continued appearing. In the same period, Abú Bakr, surnamed al-Házimí, who died in Baghdád in the year 584 A. H. (1188), had composed, among other writings, two treatises on the origins and the third on places-names which, though pronounced alike, were applicable to different places.[2]

Abu'l-Fidá' has utilized[3] two books of a writer named Abu'l-Máj Ismá'íl al-Mauṣilí who appears to have dealt both with the origins as well as the names which, though resembling each other, were actually different from one another. The author was born at Mauṣil in the year 575 A. H. (1179) and died in 655 A. H. (1257)[4]. The first of these two works bears the title, *The Book which clarifies Doubts on uncertain Origins*[5]; the other is called, sometimes, *The Book of Separation*[6], and sometimes, *The Book of Distinction.*[7] In addition to these, the Bibliothèque royale possesses a treatise of names which resemble with one another, by a contemporary of Abu'l Fidá', who was named al-Dhahabí[8].

Concerning the science of origins in the true sense, the book which has had a great reputation, is the treatise composed by Abú Sa'd 'Abd al-Karím who was born at Merv in Khurásán, in the year 507 A.H. (1113) and who

1. Dic. Kn., v. I, p. 732.
2. Dic. Kn., v. I, p. 685.
3. G-A. v. II, p. ٢.
4. Dic. Kn., p. 96, of the text and p. 187 of vol. I of the translation. See also Dic. Bib. Kf., v. IV, p. 483 under فوز فى مسئلة اسماء البلدان
5. مزيل الارتياب عن مشتبه الانتساب
6. كتاب الفيصل
7. كتاب التمييز
8. Ancien fonds arabe, no. 862. For the author, see Dic. Kn. by M de Slane, v. I, p. XXIV.

died in 563 A. H. (1167)[1]. 'Abd al-Karím descended from a line of illustrious persons who were reputed on account of their knowledge, and he himself left a son who maintained the glory of his name. All the members of this family were known by the surname of al-Ṣam'ání since they recognise as their common ancestor, an Arab named Ṣam'án of the tribe of Tamím. 'Abd al-Karím, in order to make his treatise more exact and more complete, took pains to travel over Khurásán, Transoxiana and other countries, seeking for the learned men of every country and putting down in writing, day by day, the information they furnished him. The number of persons to whom he addressed himself comes to nearly 4000. The treatise of al-Ṣam'ání carried the title of *Kitáb al-Ansáb*, or *The Book of Origins.*[2] The author did not confine himself merely to the fixing of orthography of names and determining their sense, but also gave, in some detail, the lives of the personages and description of the places from where they had received their surname. The book was composed in eight volumes.

Eight volumes means a considerable amount of work, particularly in a country where, and in times when, the printing press was unknown. These books, however, by their very nature, present some lacunae; there are even some erroneous assertions. A writer of Mesopotamia, the famous Ibn al-Athír[a], who flourished at the end of the

1. Dic. Kn., v. I, p. 418.

2. كتاب الانساب. See Dic. Bib. Kf. v. 1, p. 456.

(a) Ibn al-Athír (1160-1233) was one of the greatest chroniclers of medieval times. His main work is a universal chronicle down to 1231 called the *Kámil*. The earlier part of it, down to c. 915 is essentially an elaboration of the *Kitáb akhbár al-rusul wa 'l-mulúk* of al-Ṭabarí. A continuation of the *Kámil* was composed by Maḥmúd ibn Salmán ibn Fahd al-Ḥalabí. He also compiled the dictionary of the contemporaries of the Prophet and an abridgement of Ṣam'ání's *Kitáb al-Ansáb* referred to by Reinaud.

Kámil has been edited in 14 volumes by Tornberg (Leyden, 1851-1876); Búláq ed. in 12 volumes (1873-1886) without index. See also Ges, Ar. Wer. 113, 1181; Ges. ar Lit. v. 1, 345, 1898; EI. v. 2, 365, 1916.

12th and the beginning of the 13th century [1], remodelled it and condensed it in three volumes. This new work which received the title of *The Book containing what is the Purest, for rectifying the Origins,* [2] led to the neglect of the original treatise. And finally, three centuries later, Suyúṭí, the Egyptian writer, summarised the abridgement of Ibn al-Athír and reduced the whole book into a small volume after including some new matter. The new abridgement which is called *The Marrow of what is the Purest* [3] has been published recently.[4]

Abu'l-Fidá' sometimes mentions a writer named Abú Manṣúr Mauhúb, surnamed *al-Jawálíqí* from the Arabic word *Jawálíq* (which means 'sack'), since his father or one of his grandfathers used to weave or trade in this commodity. Mauhúb was born at Baghdád in the year 466 A. H. (1073) and died in the year 539 A. H. (1145)[5a]. He devoted himself to the study of grammar and other sciences and also performed the duties of Imám at the court of the Caliph of Baghdád and led the prayer congregations five times a day and, so to say, served as his chaplain. Among his other books there is one which carries the title of *al-Mu'arrab*[6] or *The Arabicised,* apparently because he, among other things, dealt with some geographical names which were in use before the appearance of the Arabs on the scientific scene and which were subsequently absorbed in their language.

The first part of the 12th century was significant

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1. Dic. Kn. v. I, p. 482.

2. كتاب الالباب فى تهذيب الانساب

3. لب اللباب

4. Leyden, 1840. The editor is M. Veth, Professor of Oriental languages in Amsterdam.

5. See Dic. Kn.

6. المعرب . See Dic. Bib. Kf.

(a) See Brockelmann, *Gesh. der Ar. lit.*, S. I, p. 492. Brockelmann gives the date of his death : 19. 7. 1144.

for the travels of a certain Spanish Arab who could have rendered marked services to geography and natural history only if he could have been as critical and rational as he was inquisitive. This Arab was Abú Ḥámid Muḥammad [a], a native of Granada[1]. Abú Ḥámid was born in 473 A. H. (1080). In 511 A.H. (1117) he went to sea and stayed in the Isle of Sicily for some time. The rest of that year and the next he spent in Egypt. In 516 A.H. (1122) he reached Baghdád where he stayed for some time. In 525 A. H. (1131) he embarked on the Caspian Sea and arrived on the banks of the Volga. For many years, he scoured the country of the Khazars and the Bulgars and accomplished three journeys towards the mouth of the Oxus, upto the capital of Khwárizm[b]. He visited the country of the Bulgars in 530 A. H. (1136) and witnessed the trade of that country in animal fossils which were discovered there from time to time and used to be transported to the city of Khwárizm where they were polished. He visited Baghdád again in 555 A. H. (1160) and there wrote for the Wazír, 'Aun al-Dín Yaḥya Ibn Hubayrah, his treatise

1. According to al-Maqqarí (man. arabe, Bib. roy. anc. fonds, no. 704, fol. 203 v.) this personage was also called Abú Ḥámid and Abú 'Abd Alláh from the names of his two sons. I have made this remark because the scholar M. Fraehn has made two different persons of Abú Ḥámid and Abú 'Abd Alláh (*Ibn-Fozlan's Berichte*, p. X).

(a) His full name was:—
Abú 'Abd Alláh (or Abú Ḥámid) Muḥammad ibn 'Abd al-Raḥím (or Ibn 'Abd al-Raḥmán) ibn Sulaymán al-Qaysí al-Mázini al-Andalusí al-Gharnáṭí.

(b) The earlier capital of Khwárizm was Káth (كاث) which was situated on the eastern bank of the river Káth. At the end of the 4th century A. H. (10th century), probably due to the devastations caused by the frequent floods of the Oxus, the city lost its position to Jurjánia (as Arabs called it) or Gurganj (which later on became Urganj). Jurjánia became the capital of Khwárizm in the beginning of the 5th century A. H. (11th century). Urganj which was situated 80 miles west of Káth on the left bank of Wazaq canal, was in its turn destroyed by the Mongols under Chingiz Khan in early 13th century. It was this capital which was visited by Abú Ḥámid. In 628 A. H. (1231) a new capital, Khwárizm, (modern Khiva) was raised on the ruins of Urganj.

called *The Compendium of peculiar Remarks on some Marvels of the Maghrib*[1]. Two years later, he reached Mauṣil where he composed his second treatise called *A Gift for Intelligent persons and a Selection of Peculiar things*[2]. He died in Damascus in 565 A. H. (1170). Besides the regions already indicated, Abú Ḥámid appears to have visited Arabia, Khurásán, the interior of Africa and some other countries.[3]

I could not find Abú Ḥámid's first book, but the Bibliothèque royale possesses many copies of the second[4]. This book, as mentioned by Ḥájí Khalfa[5] as well, includes an introduction and four chapters; the first chapter contains a general description of the world and its different inhabitants, including genii and man; the second chapter treats some peculiar things of certain countries and their remarkable edifices; in the third chapter there is an outline of seas and islands including an account of extraordinary animals living in them; the fourth chapter is devoted to the cavities which exist in the earth, the fossils of animals, etc.

This book, judged from the number of copies which are available in the Bibliothèque royale seems to have been sufficiently studied by the Orientals. The fabulous narratives which frequently occur in this book provide interesting reading. Qazwíní utilised both the books in writing his *Marvels of Creation* [a] and *Monuments of Countries*.[b] I shall discuss these later.[c]

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1. المغرب عن بعض عجائب المغرب. See Dic. Bib. Kf., v. IV, p. 189 and 190.

2. تحفة الالباب و نخبة الاعجاب

3. This assumption has been deduced with the help of the books of al-Maqqarí and Ḥájí Khalfa, already quoted; besides, there are evidences furnished by the author himself in his book *Tuḥfat al-Albáb*. For 'Aun al-Dín see Dic. Kn. under Yaḥya and C-A, v. III, p. 596.

4. Ancien fonds arabe, no. 954; suppl. nos. 861 et seq.

5. Vol II, p. 222.

(a) عجائب المخلوقات و غرائب الموجودات

(b) آثار البلاد و اخبار العباد

(c) Chapter 16.

12

AL-IDRÍSÍ

The most remarkable name among the Arab geographers of the 12th century is undoubtedly that of al-Idrísí. Abú 'Abd-Alláh Muḥammad received the surname of al-Idrísí or 'The Idrisite' since he belonged to a family which reigned over the city of Malaga after the fall of the Caliphate of Cordova in the first part of the 11th century, and this family had descended from Idrís, the founder of a family of princes who reigned in the 9th and 10th century over the Empire of Morocco.[1] Besides, al-Idrísí is also given the title of *Sharíf* because his grandsire, Idrísí, could trace his lineage to Fáṭima, the daughter of Muḥammad. The circumstances of the life of this celebrated writer are relatively less known. It is known, however, that he was born at Ceuta where his family had arrived towards the end of the 11th century.[2] He tells us in his treatise on geography that he had visited Lisbon[3] and had also had a chance of visiting the coasts of France and England[4]; that he had been to the famous mines of

1. *Journal asiatique*, April 1841, p. 362 et seq., article by M. de Slane.

2. *Bibliothèque de Casiri*, v. II, p. 13.

3. Vol. II of the French translation, p. 26.

4. G-A. v. II, p. 82.

Andalusia [1], and stayed for some time in the environs of Morocco[2], and had travelled to Constantine[3]; then in 510 A.H. (1116) on account of a certain incident which happened when he was quite young, he had to travel upto Asia Minor.[4] There is no evidence that he had penetrated into the interior of Africa, although he had collected much information about this region. According to Leo Africanus, al-Idrísí died at Ceuta, his native place, leaving behind a heritage which survived long after him[5].

It is certain that in 548 A. H. (1154) al-Idrísí was in Sicily, at the court of the Norman prince, Roger II [a] who had a great zeal for the sciences, particularly for geography. It was for this prince that al-Idrísí composed the treatise which made him famous in the East and the West. The book of al-Idrísí carries the title : *Delight of those who seek to travel over the World.*[6] Besides, since the book had been written for Roger, it was entitled *Al-Rujárí* or *The Rogerian.*[7] Apart from this treatise, al-Idrísí constructed for that prince a celestial sphere and a model of the then known world in the form of a disc. Both those works were done in silver. Here is an extract

1. Vol. II of the French translation, p. 66.

2. G-A, v. II, p. 188 and v. I of the French translation, p. 212.

3. Vol. I of the French translation, p. 243.

4. Vol. II of the French translation, p. 300.

5. *Bibliothéque grecque* of Fabricius, v. XIII, p. 279.

6. نزهة المشتاق فى اختراق الآفاق

7. الرجارى

(a) Roger II was the son of Roger I, the youngest of the twelve sons of Tancred of Manteville, who conquered Sicily from the Muslims after a war of 30 years. Roger II carried on war advantageously against the Muslims of N. Africa and the Emperor of the East. He ruled from 1097 to 1154.

from the biographical dictionary of Khalīl al-Ṣafadī[a] under the head, 'Roger'[1]: "Roger had a great taste for philosophical studies. He invited Sharīf al-Idrīsī from Africa and entrusted to him the task of constructing something like a model of the world. On al-Idrīsī's request the King gave him a quantity of silver weighing 400,000 drachms. Al-Idrīsī prepared a certain number of circular loops, like that of the celestial sphere and these loops were fitted one inside the other. The construction of this apparatus[b] required only a very little part of the silver which was handed over to him, but the King awarded him all the remaining as a prize for his zeal, and also added to it another hundred thousand pieces of silver and a ship which had arrived from Barcelona and was loaded with very precious merchandise.

"Then Roger invited al-Idrīsī to live at his court, saying 'Thou comest from the family of Caliphs, but had

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1. رجار . The worn out volume where this passage occurs was brought recently by M. de Slane from Constantinople and presented to the Bibliothèque royale.

(a) Al-Ṣafadī (1296—1362) was of Turkish descent. He was a very prolific author and stated himself in his autobiography that his compositions would fill 500 volumes. Many of his works are worthless compilations of verse and prose from modern authors. This most important work of al-Ṣafadī which has come down to us, in part, is his enormous biographical dictionary, *al-wāfī bi'l-wafayāt*, in about 30 volumes. We find in the *wāfī* many biographies for which we should look in vain in other works of a similar nature.

Al-Ṣafadī also composed a geographical treatise named, *Masālik al-Abṣār fī Mamālik al-Amṣār*, a manuscript of which is available in the Ṣādiqiyya Library of Tunis.

(b) The instrument is called the 'armillary sphere' consisting originally of three rings corresponding to the meridian, the ecliptic and the colure of the solstices. More rings were added later to give the coordinates of the stars with respect to the horizon. The colure is either of the two great circles supposed to intersect each other at right angles in the pole of the heavens, one passing through the solstical and the other through the equinoctical points of the ecliptic.

thou been in a Muslim country, the prince of that country would have suspected thee and would have attempted to put thee to death. Stay in my kingdom and I shall take care of thy person'. Al-Idrísí, after he had been persuaded to stay, was given by the king, the rank of a prince. Al-Idrísí used to go to the court on a mule and whenever he arrived, the king always rose as a mark of honour to him and they would sit together. One day the King said to al-Idrísí, 'I would like to have a description of the earth made by direct observation and not from books.' Then Roger and al-Idrísí chose some intelligent and honest persons, who were sent out to travel in all the four directions. To them were attached draughtsmen who were commissioned to reproduce from nature what they found interesting. All parties had orders to take down notes of everything, and that nothing which could arouse curiosity was to be omitted. Whenever any of these persons arrived with some information, al-Idrísí used to insert in his treatise the remarks which were communicated to him. That was how the *Nuzhat al-Mushtáq* was compiled."[7]

During the time when al-Idrísí was staying in Sicily, the Norman power had reached its zenith and this circumstance provided all such facilities as al-Idrísí wanted for his work. Beyond Sicily, Roger possessed a big part of the Italian mainland. Besides, a part of the population of Sicily consisted of early Arabs and Africans who had, for long time, been masters of this land, and who continued to profess Islam. The Christian and Muslim civilizations existed side by side in Palermo and Messina and to these two ports, ships arrived every day from all the four corners of the world. Al-Idrísí profited by the information which the travellers brought from Africa, Egypt, and Syria, and at the same time, he utilized the useful part of the notions held by contemporary Christians. Not only did he write a detailed description of Sicily, Italy, France, Illyria and Germany, but he also presented an accurate picture of the Scandinavian peninsula, of which

the ancients had only a very vague idea. As for the islands situated off the western coast of Africa, whose number was exaggerated, he borrowed, for his writings, the legend of an Irish saint named St. Brandaine who was very much respected in those times in the West.[1] As regards India, China and the Oriental seas, although there is no evidence that he was aware of the narrative of Sulaymán and the observations which were associated with it, he had at his disposal *Murúj al-Dhahab* of al-Mas'údí and *Kitáb al-'Ajá'ib* from where he has borrowed pages after pages. It appears, moreover, that he had drawn upon the treatise of al-Jayhání which has not reached us. Unfortunately al-Idrísí was imbued with the idea, formerly held by Hipparchus and Ptolemy, that the coast of the African continent was prolonged indefinitely to the south and east. Later on, following al-Idrísí, this supposed prolongation was developed parallel to the equator, to a distance more or less approaching the equinoxal line. Consequently the big Sea of India[a] came to be considered as a great lake which had no connection with the External Sea[b], except by means of a narrow channel. It can be understood what enormous confusion must have been introduced in that part of al-Idrísí's book.

For a long time the scholars of Europe did not know about this book except in the form of an abridged volume which was published in Arabic and Latin from a rare manuscript of the Bibliothèque royale.[2][c] But now

1. G-A. v. II, p. 263 et seq.

2. Suppl. arabe, nos. 892 and 893.

(a) The Indian Ocean.

(b) البحر المحيط

(c) The abridgement of the text was published at Rome in 1592 and a Latin translation was printed at Paris in 1619 under the title, *Geographia Nubiensis, id est accuratissima totius orbis in septum climata divisi descriptio continens, peraesertim exactam universae Asiae et Africae, in Latinum versa a Gabriele Sionita et Joanne Hesronita.*

several copies of the complete treatise are available[a] and two of them exist in the Bibliothèque royale. M. Amédée Jaubert's French translation has been made from these two copies[1].

Here is an extract from the preface[2]: "Since the extent of Roger's possessions was great, this prince, on account of the interest he had in noble and critical studies, engaged himself in the collection of statistical material relating to his vast territories. He wanted not only to know in a positive manner their bounding limits, the land and the sea routes which cross them, the climates in which they happen to be situated, the seas which wash their shores, the canals and rivers which provide water for them, but also to add to this knowledge that of other lands which are beyond his authority and extend over the vast surface of the earth which is divided into seven climes by authoritative writers of geography, who had applied themselves to determine the extent, the subdivisions and appendages of each clime.

1. It was I who had informed M. Jaubert about these two MSS. See my *Fragments arabes et persans sur l'Inde*, p. XVII (*Journal asiatique*, Aug. 1844, p. 125). The translation of al-Idrísí by M. Jaubert has been made under the auspices of the *Société de Geographié de Paris* and forms the 5th and 6th volumes of the proceedings of this learned Society, but it is also available separately.

2. Translation by M. Amédée Jaubert.

(a) S. Maqbul Ahmad has published (Ar. Pub. No. 2, Deptt. of Arabic & Islamic Studies, Muslim University, Aligarh, 1954, pt. I) the Arabic text of a part al-Idrísí's book dealing with the first and second climes (which include India and the adjacent countries) from a comparative study and collation of five manuscripts which were available to him. These manuscripts were :—

(i) Bodleian—Pocock 375, (ii) Bodleian—Gravil 42, (iii) Bib. Nat., Paris, No. 2221, (iv) Bib. Nat., No. 2222, (v) British Museum, Supp.. 685, Or. 4676.

In his opinion, No. (iii) is the best. No. (v) which is an bridgement and the Rome abridgement (see above) are untrustworthy. These abridgements, according to him, were made very carelessly and have resulted in confusion and distortion of facts.

"In order to collect clear, precise and detailed information he, instead of referring to books which are necessarily full of obscurities and doubtful matter, collected persons who were supposed to know these things and questioned them on the subject, but he was not satisfied. He then decided to search for well-informed travellers in all his lands. He called them in his presence and interrogated them singly or collectively through interpreters. Whenever their accounts agreed and they were unanimous on a point, that point was admitted and considered correct and whenever it was otherwise, their views were rejected and put aside.

"He carried on this work for more than fifteen years ceaselessly, without relaxing the personal evaluation of all geographical questions which required investigation and verification of the correctness of facts, in order to gain completely the knowledge he desired.

"Then he wanted to know, in a positive manner, the longitude and latitude of places, and their respective distances from points on which the aforesaid persons agreed. For this, he had a sketch made on a board on which were traced, by means of a compass[1], the points indicated in works of reference and on which there was a general agreement among different authors and were therefore considered absolutely correct. Lastly, he ordered the construction of a planisphere[2] of enormous size in pure faultless silver, 450 Roman pounds in weight, each pound being 112 drams. He got engraved on it by capable workmen, the configuration of the seven climes along with the outlines of regions, countries, the near or distant shores of seas, the arms of seas, the oceans and currents; the distribution of deserts and cultivated lands, their respective distances by frequent routes in standard miles or any other unit,

1. مقاييس pl. of مقياس. The Arabic word means specially the style of a sundial and is synonymous to Greek *gnomon*.

2. دائرة

and the location of ports. These workmen were required to adhere strictly to the model traced on the sketching board without deviating in the slightest detail from the configuration indicated there.

"He got a key-book compiled for understanding this planisphere, containing a complete description of cities and their environs, the types of culture and settlements, the extent of oceans, mountains, rivers, plains and hollows.) This book necessarily dealt, besides the subjects mentioned above, with the varieties of cereals, fruits and plants which grow in certain countries, the properties of these plants, the art and the things in which their inhabitants excel, their exports and imports, curious objects which are remarkable or famous in the seven climes, the state of the peoples who live there, their outward appearance, their manners, customs, religion, dresses and idioms."

This passage reveals that the representation of the world known in the time of al-Idrísí was not in the form of a globe but as a plane surface. M. Jaubert has truly observed that the word used in the text signifies a 'circle' i.e. a round table and not a globe. In fact it is a term which is used for a planisphere in Arabic works. For example, the book of Ibn al-Wardí shows even the design of such a planisphere.[1] It is not that the Arabs did not know for a long time the spherical trigonometry, invented by Hipparchus, and which ever continued to be utilised by them for their knowledge of higher geography and astronomy. The proof of this is found in the celestial globes which have come to us through the Arabs; but the terrestrial globe was not known. This is true not only for the Arabs but also for the Greeks and the Romans; the view of a terrestrial globe would probably astonish even Hipparchus, Eratosthenes and Ptolemy, if these people

1. It is wrong that M. Tornberg, in his extracts of the treatise of Ibn al-Wardí (Upsal, 1835, p. 6 of the text and p. 11 of the Latin version) has translated the word دائرة into 'globe.'

returned to the earth. None of the geographers had sufficiently clear idea regarding its general effect as to put forward a complete representation of the globe.

There are two copies of al-Idrísí's treatise which are accompanied by maps; one is in Oxford and the other in Paris. These maps, 69 in number, replace the metal planisphere, and the author, in writing his treatise, has presumed that the reader would always have them before his eyes. It is on this account that in his text he has, in general, neglected to insist on the position which places occupy in relation to one another. Thus, the study of the maps is indispensable for understanding the book. Unfortunately these maps, not unlike other Arab maps which have come down to us, are not graduated and lack wholly in geometrical precision. It is impossible to ascertain with their help alone, the system of projection which has been employed for the planisphere. M. Jomard, the curator of the maps and plans section in the Bibliothèque royale, whose profound zeal is well known, has added to the French translation of al-Idrísí, three maps as samples. Later on, he collected in a big file all the maps, and has transcribed, under my direction, all the names marked therein with the intention of publishing a separate vocabulary of these names. This publication will be all the more useful because M. Jaubert had not taken much advantage of these maps and that in his translation many of the place-names have been distorted.[a]

But, as already said, these detailed maps are insufficient for giving an idea of the system of projection followed by

(a) Konrad Miller, *Mappae Arabicae* (Stuttgart, 1926-27; Isis, 9 458-462), part 2 of vol. 1 discusses the larger map of the world and in part 3, the smaller map of 1192; both these maps are reproduced schematically and analysed; vol. 6 contains 33(photographic reproductions of all the maps of al-Idrisí available in MS. (80 pl., Stuttgart, 1927; Isis, 11. 173).

See also H. von Mžik : *Ptolemaeus und die Karten der arabischen geographen* (Mit. der Geogr. Ges., vol. 58, 152, Wien, 1915).

the author. Moreover, like the principal maps of the treatises of al-Iṣṭakhrí and Ibn Ḥawqal, certain parts of the world, about which the author could not collect sufficient information, are omitted. This is why it was necessary to fill up some details in the general map placed in the beginning which otherwise was not sufficiently elaborate due to the smallness of its size. This general map appears to me to correspond exactly to the disc cast in silver. Dr. Vincent has already published, from a manuscript of Oxford, a sketch of this map, in his book, *The Periplus of the Erythraean Sea.* Another sketch which is inserted here was made from the Oxford and Paris manuscripts. This sketch has been traced by M. Jomard and I have added a few proper names to it. Some parts of the original had suffered ravages of time and M. Jomard has contented himself by indicating those parts with the help of dots.

The treatise of al-Idrísí is divided in accordance with the sequence of seven climes. It would be seen that the same sequence was followed by al-Farghání and al-Jayhání. We do not know much about the book of al-Jayhání, but as for that of al-Farghání, his descriptions proceeded from east to west, whilst, with al-Idrísí, they proceeded from west to east in keeping with the longitudes. However, al-Idrísí, for the sake of giving more elaborate account, had to establish some sub-divisions and consequently he subdivided each clime into ten sections. Nevertheless, he has not taken into consideration either the political divisions for any period, or the differences of language and religion, or the direction of seas and mountains.

Al-Idrísí, on some occasions, has maimed rather than advanced scientific knowledge.[1] But his book, taken as

1. On M. Jaubert's translation of al-Idrísí, M. Quatremére had written two articles (*Journal des Savants*, 1843), which were very feeble in general notions and which I have never found satisfactory. In the preliminary discourse of the *Relation des Voyages*, p. clxxiv, I have observed that M. Quatremére should have said at least a few words on the weakness of that part of al-Idrísí's book which deals with Eastern countries. M. Quatremére discussed this point in the *Journal des Savants* of Dec., 1846, p. 744, and after having begun by discarding my opinion, he reproduced it in other terms.

a whole, is, like that of Strabo, a veritably eminent landmark of geography.) Very often I have had recourse to it in my notes. In order to bring out the full utility of the book it is necessary that some scholar should take upon himself the task of publishing a critical edition of the text. Many of the passages have been badly interpreted by M. Jaubert; the collation of Paris and Oxford manuscripts would help in establishing a satisfactory text.

The parts which deal with Africa have been treated excellently in an abridged form by Hartmann under the title, *Edrissii Africa*, Göttingen, 1796, But certain other documents have been published since then, and they have to been taken into consideration.[a]

(a) Some sections of the text of al-Idrisi's *Nuzhat al-Mushtāq*, have now been edited and published with translation and annotations; but the main task of publishing the complete text of his work still remains unaccomplished. Some of these works, already published, are as follows:—

1. Spain by J. A. Conde, Madrid, 1799, in Arabic and Spanish.
2. Africa and Spain by R Dozy and M. J. de Goeje, Leyden, 1866, in Arabic and French.
3. Spain by Antonio Blasquez, Madrid, 1901, in Spanish only.
4. Italy by M. Amari and C. Schiaparelli, Rome, 1883, in Arabic and Latin
5. Syria and Palestine by J. Gildemeister, Bonn, 1885, in Arabic and German and also by R. A. Brandel, Upsala, 1894, in Swedish.
6. Finland and other Baltic countries by Tallgren, *Geographie*, VII. 4, in French.
7. British Isles by Professor A. F. L. Beeston, *Bull, School of Oriental and African Studies*, v. xiii, pt. 2. 1950.
8. Professor T. Lewicki has published the Arabic text dealing with Poland and the neighbouring regions with a translation in Polish and a commentary identifying place-names etc. (Tadeusz Lewicki: *Polska i Kraje sasiednie w swietle 'Ksiegi Rogera'*, in two volumes, Krakow, 1945 and Warsaw, 1954, Polska Akademia Nauk). Professor Lewicki's work is an extremely valuable study of al-Idrisi's writings and should serve as a guide to future Idrisi-studies.
9. On India, S. Maqbūl Ahmad has published the Arabic text of al-Idrisi (see above). He has also translated the same into English and has written a commentary identifying place-name etc., which it is hoped will soon be published.

An interesting question arises here. Abu-'l-Fidá' has often borrowed from al-Idrísí; sometimes the passages, which he quotes as those of al-Idrísí, are found neither in the abridgement nor even in the complete text. On the first page of his book, Abu'l-Fidá' mentions a book of al-Idrísí and refers to it by its generic title, *The Book of Realms.*[1] Some scholars have, therefore, deduced that al-Idrísí had written a treatise on geography different from the one which is known to us[2]. This opinion is further confirmed by the evidence of an Arab poet of Sicily named Ibn Bashrún who was the author of a book called, *The Elite of the Spaniards.*[3] Ibn Bashrún describes his meeting, in the capital of the island, with a writer named Muḥammad who had already written for the King of the island, Roger, the Frank, a voluminous book called *Delight of those who seek to travel over the World.*[4] He further adds that Muḥammad also composed, for the son of Roger named Guillaume, a book on the same subject, but more voluminous than the former to which he gave the title, *The Pleasure grounds of Humanity and Delight for the Soul.*[5]

This is evidently the book which was available to Abu'l-Fidá' and which has never reached us. Besides, Ibn Bashrún praises the talent of al Idrísí for poetry and also quotes some of his verses.[6]

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1. كتاب الممالك . See also v. 2 of the translation of Abu'l-Fidá': articles on Tyre, Caesarea of Palestine and St. John of Acre (Abu'l-Fidá', p. 243 of the text and al-Idrísí, vol. 1, p. 349; Abu'l-Fidá', p. 239 of the text and al-Idrísí, vo. 1. p. 349 ; Abu'l-Fidá', p. 270 of the text and al-Idrísí, v. 1, p. 348).

2. Rommel, *Abulfedae Arabiae Descriptio*, p. 2 et seq.

3. المختار من الاندلسيين

4. نزهة المشتاق فى مخترق الافاق

5. روض الانس و نزهة النفس

6. خريدة القصر . Man. ar. Bib. roy., anc. fonds, no. 1376, fol. 49; suppl. arabe, no. 1411, fol. 12, v.

Al-Idrísí mentions in his preface the principal books which served as sources for his own compilation. Some of them have already been mentioned above, e. g., the treatises of Ibn Ḥawqal, Qudáma and Ibn Khurdádhbih,[1] but there are certain types of works which al-Idrísí has not mentioned at all but which must have been used by him. We will now proceed to examine these works.

1. This information is given only in one of the manuscripts of the Bib. roy. The writing is more recent than the body of the volume, and some names appear to have been altered.

(a) J. Horowitz discovered in the library of Ḥakím Oghlú 'Alí Páshá in Istanbul a MS. (no. 698) entitled *Rawḍ al faráj wa nuzhat al-muháj* (*Garden of Pleasure and Delight of Souls*), said to have been composed by al-Idrísí in 1192. This is impossible, for al-Idrísí died in 1166, but it may be a copy or a summary of a part of the *Rawḍ al-'uns*. The text in this MS. is accompanied by 23 small maps forming a sort of atlas. Konrad Miller edited this atlas in 1927

13

ARAB ITINERARIES

I have already mentioned that, among the Arabs of Spain and Africa the memory of their ancestors remained ever present in all their activities, and that the writers, in their style, preferably employed the expressions and familiar imagery of their ancestors. Moreover, even the Muslims of distant lands were obliged to undertake, at least once in their life time, a pilgrimage to Mecca. In Spain and in Africa, there were few enlightened men who had not drunk the water of the Nile and had not paid their homage to Ka'ba. Some of the pilgrims took to sea and headed for Alexandria but most of them took the land route. The latter course was more fruitful for the men of science, since they could acquaint themselves with the interesting countries and the learned men coming across their way. It was also advantageous for the pious and holy persons since they could procure the benedictions of the scholars of the highest order and of persons reputed for their saintliness, as also for the poor, since the land route practically cost nothing. The simple and poor folk who dwelt in these regions were noted for their spirit of hospitality. Moreover, in that period the national spirit among the Muslims was most pronounced and the affluence of rich European tourists had not yet accustomed the natives to the habit of fleecing the travellers. The pil-

grims, while travelling from city to city and from mosque to mosque, found charitable persons who received them and who felt honoured in playing host to them. Not only did the professors and men of law welcome them most heartily, but there also existed certain religious trusts for the purpose of entertaining these travellers. And if someone knew a little of jurisprudence or medicine in addition to the knowledge of the Qur'án and the Traditions of the Prophet, he was particularly welcome everywhere[1].

The majority of the pilgrims, after performing their pilgrimage in Arabia returned to their homes, but a certain number of them would proceed towards the Euphrates and the Tigris and would visit Baṣra, Kúfa and Baghdád. This detour not only had the advantage of bringing under their observation the cities which then occupied the first rank in the scale of civilization, but also familiarised them with the life and language of the momads of the desert, which were of utmost interest even to those Arabs who lived in fixed settlements. Some of the travellers, therefore, went upto Bukhárá and Samarqand where the sciences had made great strides of progress, and on their return to their homes they received general felicitations. These travels were considered as a sort of superior course which elevated a person to a kind of doctorate.

There exist a great number of narratives of travels per-

1. In all the cities of some importance in Africa, there were one or more buildings reserved for the accommodation of the poor and the pilgrims. These houses are called, in the narrative of al-Bakrí, and the treatise of al-Idrísí, *Mḥaras* محرس (G-A, v, II, p. 179). M. Quatremere, in his note on the narrative of al-Bakrí, did not know the sense of this word (see Not. Ext., v. XIII, pp. 465, 462 et seq).

(محرس pl. محارس has been used by various Arab writers in the sense of an enclosure, or a building used for lodging the students, the monks, the travellers and the poor. See *Description de l' Afrique et de l' Espagne, par Edrisi*, by Dozy and de Goeje, Leyden, 1866, pp. 283-284.....tr).

taining to this type. These narratives were distinguished from the ordinary treatises by the fact hat they were not didactic in character, and the authors confined themselves to a description of only those places which they had visited, and the persons and things which they h d observed. Further, these treatises were called by the simple name of 'Itineraries[1]'. I shall mention some of them.

Abū Bakr Muḥammad, surnamed Ibn al-'Arabī was born in Seville. In 485 A. H. (1092), at the age of sixteen, he started his trave's with his father who was a very learned man, and proceeded towards Syria. After studying there for some time he came down to Baghdād where he sought the counsels of the scholars of the capital. In 489 A. H. (1096) he performed the pilgrimage and crossed the desert. Later, he returned to Baghdād and came in contact, among other personages, with the famous al-Ghazzālī. He then visited Egypt and stayed for sometime in Cairo and Alexandria. He did not return to Spain till after eight years of absence. Among his other writings he published an itinerary.[2]

The libraries of Escurial and Leyden possess another itinerary, written in the later part of the 12th century by a Spanish Arab named Muḥammad Ibn Jubayr. The family of

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1. الرحلة See the Dic. Bib. Kf., v. III, p. 350. Al-Maqqarī, in his big book on Spain has devoted a long chapter on the principal Arabs of Spain who travelled East. (Man. ar., Bib. roy. anc. fonds no. 704, fol. 156 et seq). Al-Maqqarí begins the next volume (no. 805) by an account of renowned Easterners who visited Spain.

[Shihāb al-Dín al-Maqqarí (1591-1632), a renowned man of letters, biographer and traveller, belonged to a family of scholars who lived in Maqqara (Algeria). He travelled East to Egypt and Arabia and stayed for some time in Damascus where he used to teach Hadith. His masterpiece, *Nafḥ al Ṭib min Ghuṣn al-Andalus al-Raṭib etc.*, is a long monograph on Muslim Spain and is full of literary and historical information. The first chapter contains an account of the physical geography of Spain. Reinaud refers here to the 5th and 6th chapters of this treatise......tr.]

2. Dic. Kn., ed. M. de Slane, v. I, p. 685 and v. III of the translation, p. 15.

Ibn Jubayr originally belonged to Xativa[a] and had sprun off the old tribe of Kinána, which had occupied the neighbou hood of Mecca. Ibn Jubayr was born in Valencia in 54 A. H. (1145). After having extensively studied the Qur'ār the Traditions of the Prophet, belles-letters and jurispru dence, he became the secretary of a prince of the dynasty c Almohades,[b] who held the charge of the government of th city of Granada. He earned for himself the reputation c an excellent writer and a poet of distinction. One day, whe he was writing a despatch, the prince, who was a little drunk presented him a cup of wine; the secretary refused the win saying that he had never tasted the stuff. "By God' exclaimed the prince, "Thou shall have to drink this cu seven times". He was thus compelled to resign himself this sin. The prince, however, tried to recompense this de by filling the cup seven times with pieces of gold. The sometime later, either owing to a scruple of conscience or i order to keep away from his capricious and violent maste Ibn Jubayr asked his permission to undertake pilgrimage t Mecca. Having obtained the permission he sold out all hi belongings and added to it the price of gold which the princ had given him and left Spain.

Ibn Jubayr left Granada on Feb. 3, 1183. He coul not help casting his eyes gloomily over the hills of Alhamar and. then, as he went farther away, over the prominent pea of Shulayr[1c]. He took the land route of Tarifa[d] where h crossed the strait and came to Ceuta. He then boarded Genoese boat which got him in a ship bound for Alexandria

1. G-A. v. II, p, 253.

(a) Modern Jativa, in the province of Valencia (Spain). The Ara city was called Shatiba which was a strategic fortress-town at the fo of Mt. Bernisa. It was famous for the manufacture of paper in th Middle Ages.

(b) Abu Sa'id b. 'Abd al-Mu'min, governor of Granada.

(c) Sierra Navada.

(d) A port-town 21 miles S. W. of Gibralter.

It is known that the pilgrims who disembarked in Egyp proceeded to Mecca by crossing the Isthmus of Suez. Bu by this time the warriors of the West had established a king- dom in Jerusalem, and sometimes their detachments inter cepted the passage[1]. Ibn Jubayr, after seeing what interestec him most in Alexandria and Cairo, proceeded along the Nil upto Qúṣ[a]. There he joined a caravan which was headin towards 'Aydháb[b]. Of the two routes which meet at 'Aydháb the caravan took the one called al-Wadha and which ha been mentioned by Abu'l-Fidá[2]. Ibn Jubayr embarked fo Jidda, from where he went to Mecca to perform his sacrec duties. He then visited the tomb of Muhammad at Medina and after crossing the desert, he arrived successively at Kúfa Baghdád and Mauṣil. On his return, he crossed Mesopotami and visited Aleppo and Damascus, and then he came t embark at St. Jeand'Acre. This was the moment wher Saladin had accomplished the conquest of the kingdom Jerusalem. Ibn Jubayr passed by the fortress of Paneas[c] situated near the source of the Jordan, which belonged to th Muslims and on going further he entered the Christian terri- tory.

Ibn Jubayr boarded a Christian vessel. The Muslim had tried in vain to build up a navy and, for a long time the ships of Venice, Pisa and Genoa were masters of the sea The traveller stayed for some time in the island of Sicily

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1. See my *Extraits des historiens arabes relatifs des Croisades*, Pari 1829, p. 186, et seq.

2. G-A, v. II, p. 144.

(a) A town in Upper Egypt on the east bank of the Nile. In th early centuries of *Islam*, Qúṣ was of lesser importance than the adjoin ing town of Qifṭ. In the 8th century A. H., it became the larges *town of al-Sa'íd (Upper Egypt) and the second largest in* the whole o Egypt. This was evidently due to the changes caused by the Crusad in the great trade-routes from west to east.

(b) 'Aydháb' is identified with Aidip lying on the sea-coast oppo site *Jidda at lat. 22° 14' 47" N. Minorsky, Ḥudúd, p. 474*).

(c) Bániyás, at the foot of Mt. Hermon, in Syria.

where the Muslims were yet numerous, but where they did not enjoy the same amount of liberty as they did in the time of al-Idrisi. Ibn Jubayr disembarked at Cartagena[a] and re-entered Granada on 25th April, 1185.

The narrative of Ibn Jubayr carries the generic title of *The Itinerary of the Kinanite*[1] by allusion to the name of a tribe with which the author proudly associated his origin. Besides, the author has given it the special title of *The Book for the Meditation of the Devout on Noble Monuments and Religious Places*[2]" This book is not only of religious interest, but has also a geographical and historical significance. The portion which treats the position of the Muslim population in Sicily in this period and which has been published recently, is of very great interest[3], The history of the Crusades would necessarily profit from some details that are connected with Egypt and Syria. M. Reinhart-Dozy, the oriental scholar of Leyden, has prepared an edition of the entire narrative[b].

Ibn Jubayr had returned to Spain fired with the zeal of contest which had then begun between Saladin and the Christian colonies of the East. When he heard of the entry of Saladin into Jerusalem, he could not restrain himself and he put himself onroute to the East. He returned a third time in 1217, but on returning from Mecca he died at Alc-

1. رحلة الكنانى . M. Flügel in his beautiful edition of Dic. Bib. KZ. has written *Rihlat al-Katani*, (رحلة الكتانى) by mistake.

2. كتاب إعتبار الناسك في ذكر الآثار الكريمة والمناسك

3. This portion has been published by M. Amari in *Journal asiatique*, Dec. 1845 and Jan. 1846.

(a) A port in the province of Murcia in Spain.

(b) Complete Arabic text of the *Rihla* was published by William Wright in 1852 (Leyden). A new edition revised by M. J. de Goeje appeared in English under the title : *The Travels of Ibn Jubayr* (Gibb Memorial Series, vol. 5, Leyden, 1907). There is also a complete edition in Italian named, *Ibn Gubayr* by C. Schiaparelli, Rome, 1906.

A complete Urdu edition entitled *Safar-náma Mohammad Ibn Jubayr Andalusi* was published by Hafiz Ahmad 'Ali Shoq, Rampur, 1900.

[illegible]. Besides his itinerary he has left a collection of poems among which two, in honour of Saladin, are particularly remarkable[1].

One finds as well, in the libraries of Escurial and Leyden, an itinerary of another Arab, a native of Valencia, named Abú Muḥammad al-'Abdari. The travels of al-'Abdari took place in 688 A. H. (1289). He started from Ḥáḥḥa[a] one of the very remote places of the Empire of Morocco, and proceeded to Mecca by land. On his return, he took the same route, crossing the Maghrib[b] twice in all its length, from Alexandria to the Atlantic. His book is devoted specially to Africa and the author gave it the title of *The Occidental Itinerary*.[2] For each of the places which he has mentioned, the traveller remarks the persons whom he had met that there and gives an account of famous people who were born there.[3]

The library of Escurial posses a third narrative of this type, written in the same period, by a great man belonging to Granada, named Ibn Rashid 'Abdalláh and surnamed al-Nushrashi. The author had travelled in Africa, Egypt and Syria with the intention of meeting persons who were well known for their knowledge. He mentions in his narrative, which was fairly voluminous, distinguished persons with whom he had made acquaintance, the principal libraries and the academies of scholars. The third volume is wholly devoted to the sketches of personages who were renowned for their knowledge in Alexandria and Cairo between 685 and 700 A. H. (1286-1300) i e. the period of the author's stay in Egypt[4].

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1. Gayangos, *The history of the Moḥammedan dynasties in Spain*, v. 2, 400 and 401.

2. الرحلة المغربية

3. Casiri : *Bibliothéque de l'Escurial*, prefaco, p. XIV and v. II, p. 165. Vincent : *Journal asiatique*, May 1845, p. 405.

4. Casiri, v. II, pp. 151 and 165.

(a) Near Magador.

(b) The western province of the Muslim Empire (i. e. Northern Africa.

One did not write an itinerary simply because he had made the pilgrimage to Mecca, but the writing was occasioned by a journey or voyage, made in some interesting countries. In the library of Escurial there is an itinerary of Africa, composed by Muḥammad Ibn Rushd who was born in 657 A. H. (1259) and died in Fez in 721. A. H. (1321). But there is a second itinerary by the same author, which deals with Spain, a country which brought back many a recollection to the minds of the Muslims ! The Christian worship was performed in the grand mosque of Cordova, and the Alcazar of Seville served as lodgings for the Castillian officers, but the call of the *moazzins* had not yet ceased to resound from the downs and dales of the city of Granada and the province. Literary history and natural history are treated simultaneously in both the narratives.[1]

The taste for travels had become general in the East and in the west; both among the Muslims and the Christians. It is true that, in the case of the latter, the travels amounted to armed marches and they were, in general, occupied only with the idea of reconquering their sacred places or to defend themselves. Another traveller, who is mentioned below is of special interest to us.

'Alí, son of Abú Bakr, was born in Mauṣil but had the surname of al-Hirawi, because his family originally belonged to the city of Hirát, in Khurásán He lead the life of a ṣúfí and of a mendicant friar. His insatiable curiosity as much as his excessive devotion impelled him to visit all places which offered some religious interest or any other attraction. He visited Jerusalem and the mosque of 'Umar in 569 A. H. (1173) when this city had fallen under the power of Western warriors. In Sicily he witnessed an eruption of Etna. During his stay in Constantinople he had, as he says, personal relations with the Emperor Emmanuel. But in 1191 in one of his voyages, he came in the way of the flotilla which was

1. Casiri, v. II, p. 86.

carrying the army of Richard Coeur de Lion to the seige of St. Jean d' Acre, and the English robbed him of a part of the material which he had collected. Richard expressed his desire to see him but 'Ali resisted his invitations. He died in Aleppo in 611 A. H. (1215).

There was nothing on land or sea, on plains or mountains which al-Hirawí did not want to see with his own eyes. His excessive taste for travel gave him the surname of *al-Sáyeh* or 'The Traveller'. His name on this account has since then become proverbial.[1] There is a fact, however, which appears to prove that a little vanity was added to so much zeal; for example, wheresoever he went, he, like the travellers of all countries and of all times, did not abstain from scratching his own name. Besides, al-Hirawi did not have to worry about his means of livelihood. I have said that, in the East, the travels of a person, particularly of one who did not worry much about his person, were not expensive; moreover, he had at his command a resource which was often employed by *súfís* and *qalandars* viz, he professed sorcery and performed tricks from sleight of hand.[2] The books of travels also mention here and there some facts in this connection.

Al-Hirawí is the author of two books, one of which deals with pilgrimage, while the other is devoted to the des-

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1. The sense of the Arabic word *Sáyeh* (سائح), derived from the verb *Saha*, is perfectly determined here, and it is conformable to the sense of the root of the word. However, this term has been applied also to the state of persons who live in solitude in the midst of mountains and forests. In my translation of the narrative of Sulaymán (p. 50) with regard to *yogis* of India, I have translated the Arabic word to 'wander', a term which is also applicable to the life of *yogis* and to the radical sense of the word. M. Quatremere, who likes to find fault with full force, has collected (*Journal des Savants*, Sept. 1846, p. 525 and 526) a large number of passages, some of which apply to the life of hermits, and deduces that the Arabic word is devoid of any idea of movement.

2. Dic. Kn. v. I, p. 481; C-A, v. IV, p. 252 and *Bibliotheque orientale de d'Herbelot* under the word *Saih*.

cription of edifices, ruins of monument and of idols. The first is usually mentioned under the title of *The Book of Indications for acquiring the knowledge of Places of Pilgrimage.*[1] It successively deals with the province of Aleppo and the rest of Syria, Palestine which is so rich in holy monuments, Egypt, the Greek Empire, Mesopotamia, Iraq, Mecca and Medina, Yemen, the Maghrib and Abyssinia. The author had not actually visited Abyssinia or the Maghrib and for these two regions, he had drawn on the accounts of some of his confederates who had travelled there. Besides, the book is not very bulky and the author apologises for the imperfection and scantiness of his descriptions due to the accident which had let fall a part of his manuscript in the hands of the English and which he was obliged to supplement by memory. He refers to one of his own books which was called *A Book of Marvels.*[2a] This was probably the one in which he treated the edifices and the monuments.

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1. كتاب الاشارات فى معرفة الزيارات

2. كتاب العجائب . Compare the Dic. Bib. Kf. v. I, p. 304 and 305; *Bib. de l 'Escurial* by Casiri, v. II. p. 172; *The Oxford Catalogue of Oriental Manuscripts,* v. 2, p. 141 and the translation of Ibn Baṭūṭa's travels by M. Lee, pp. XV, 6 and 84,

(a) See *Archives de l'orient latin* (vol. 1, 587-609, 1881) by *Charles* Schefer, which contains the French translation of the part dealing with Palestine.

Also see. Ges. ar. Lit., vol. 1, 478, 1898.

14

YÁQÚT

The Arab writer who contributed most to geography in the 13th century is Yáqút son of 'Abdalláh, surnamed Shiháb al-Dín or the 'Torch of Religion.' Yáqút was Greek by birth; he was captured in his infancy and was purchased by a wholesale merchant who had established business at Baghdád but who originally belonged to the city of Ḥamát[a] in Syria. Yáqút is not his real name; it is a word which means a 'ruby'. It was a custom in the East to designate the slaves by such words as *yáqút* or ruby, *lu'lu* or pearl, *káfúr* or camphor, etc. Again, 'Abdalláh was not the name of Yáqút's father; it is an Arabic name which means the 'Servant of God'. Actually the father of Yáqút was a Greek and professed Christian religion. Whenever a stranger embraced Islam, the Muslims changed his name and his father's as well, so as to sever all the ties of his old relations and they gave to his father the generic name of Abdalláh which has nothing compromising in it. Later, Yáqút, having regained his liberty, wanted to erase all traces of the unfortunate state which had been his lot, and changed his own

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(a) Or Hamá on the Orontes in Syria.

name to Ya'qúb or Jacob.[1] However, in his travels and in the reputation which he enjoyed, he became famous by his first name, and the name persisted inspite of him. Yáqút was surnamed al-Rúmí or 'The Roman'—a title adopted in this period even by the degenerate successors of Caesar, Trajan and Constantine. He was also surnamed al-Baghdádí, after the name of the city where he lived with his master, and al-Ḥamaví or 'the resident of Ḥamát, after the name of the city where his master was born. Lastly, the title of Shiháb al-Dín of which Yáqút was very proud, proclaimed that, although a slave, he had completed his studies as one could do in his times achieving all degrees of scholarly attainments. In those times of religious enthusiasm, and in a period when Christianity and Islam were vying with each other and when quarrels took place almost every day on the banks of the Jordan, Orontes,[a] Nile and Euphrates on one side and the banks of the Guadalquiver, Ebro and Tagus on the other, it was customary that the university students after having finished their studies received some title which certified their zeal for Islam.

Thanks to the benevolence of his master, and by virtue of his own favourable inclinations, Yáqút learned the language of the Qur'án from the very beginning and acquired a profound knowledge of Arabic literature. Later on, his master initiated him to his affairs and made him perform many journeys in the interest of his trade. In this period, the island of Kish[b] in the midst of the Persian Gulf was the meeting point of Eastern and Western interests and it

1. The change is not much marked in Arabic script, viz. يعقوب in place of ياقوت (This statement does not appear to be correct...... ...tr.)

(a) Nahr al-Assi, a river in Syria, on which Hamá and Antakia are situated.

(b) Qais, a little island in the Persian Gulf off the coast of Iran. (54°E, 26°30'N). The Persian name of the island is *Kís* or *Kish*. In the Middle Ages this island was the most important trade centre of all the other Gulf islands (including Kishm).

provided a market where the spices of India and Malaysia could be exchanged for the products of Egypt, Syria and the remote West. Yáqút travelled several times down the Tigris and visited Kish. From Kish he took a boat for the coast of Oman in the south-east of Arabia and then passed on to Syria.[a] He also visited Constantinople; this is at least what has been reported by al-Hirawí.[1]

Yáqút, having obtained his enfranchisement, took to trading for his own profit; he traded in books, which he could evaluate properly, and which furnished new material for his researches. He resided successively in Damascus, Aleppo, Mauṣil, Arbela[b] and Khurásán. Unfortunately, though he did not belong to the Islamic faith by birth, he was so much inspired by the spirit of controversy which was then so keen among the Muslims, that he frequently exposed himself to the resentment of inimical sects. Furthermore, he indulged in the idle fancies of forensic astrology.

Yáqút went to Khwárizm at a time when the ferocious Chingiz Khan was advancing with his multitudinous army towards the banks of the Oxus. This was the year 1220 of our era. With great difficulty, he managed to escape to Syria where he died in 627 A. H. (1229).[2]

Yáqút is the author of a great number of treatises[c]; two

1. Lee; *The Travels of Ibn-Baṭuṭa*. p. 84.

2. The life of Yáqút, extracted from the Dic. Kn. has been published by Hamaker (*Specimen catalogi* p. 70 et seq).

(a) Rather a very circuitous route. It appears that the order is wrong.

(b) Ancient Persian city at the site of modern Erbil (Iraq) on the Mausil-Baghdád route.

(c) The important works of Yáqút which have come down to us are :

(i) *Kitáb al Muqtadab* (on Arab genealogies);

(ii) *Kitáb Irshád al-Arib* (contains biographies of all those who have dealt with *adab*; ed. Margoliouth, Leyden, 1907-31, in 6 vols.);

(iii) *Mu'jam al-Buldán*;

(iv) *Kitáb al-Mushtarik* (dictionary of place-names of the same spelling which are applied to several different places; ed. Wüstenfeld, Göttengen. 1846,),

of them deal with geography and are written in the form of dictionaries. The first book carries the title of *A Dictionary of Lands*[1] and consists of several volumes.[a] It is found in different libraries of Europe, particularly in St. Petersburg. This is one of the most important books which the Arabic literature offers us. The author, in a long introduction, discusses the different points of mathematical, physical and political geography. He speaks of the magnitude of the earth and of the distribution of seas and mountain ranges. He gives a sketch of the seven climes and of the countries which are included in them. He does not forget to define and determine the values of certain terms which are constantly repeated in his book, such as parasang, mile, longitude, latitude, degree, minute, taxes etc.

In the main portion of the book, the names are arrange in an alphabetical order. The author begins by fixing the orthography of names; for this he spells every word which enters in his composition, without forgetting the diacritical marks which determine their sense, and the vowels which should accompany them. When this orthography is at variance, or when his personal researches permit him to correct it, he indicates what he assumes to be correct. Then he discusses the etymological significance of each name, traces its grammatica form, mentions the different opinions about its origin, and on this occasion, as he had made a profound study of Ara

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1. معجم البلدان

(a) F. Wustenfeld edited the *Arabic text* (with a most valuabl index) of the *Mu'jam al-Buldán* under the title : *Jacut's geographische Worterbuch.* 6 vols. Leipzig, 1866-1873; 2nd edition, 1924; Cairo, 1906-1907, with a modern suppl. for Europe, America etc., 10 volumes. Another remarkable edition of *Mu'jam* is that of C. Barbier de Meynard entitled ; *Dictionnaire geographique, historique et litteraire de le Perse des contrees adjacents; extraits du Mo'djem el-bouldan de Jagout et complete a l'aide de documents arabes et persans pour la plupart inedits*, Paris 1817.

See also : Ges. ar. Lit. vol. 1. 479-481, 1898. and Ernest Honigmann *Die Sieben Klimata*, Heidelburg. 1929.

philology, he sometimes reproduces some very interesting grammatical observations. Ordinarily the description of big cities is accompanied by their astronomical position, and very often this position is derived from a Grrek book attributed to Ptolemy, but which the author names as *Kitáb al-Malhama* or *The Book of Contest.*[1] The description of a city or a country sometimes includes information about the products of its soil, ths skill of its inhabitants and the language which is spoken there. The sketch of a city, as found in his book, pertains not only to the time when the author wrote the book but he also takes note of the preceding period, particularly the period which began with the Arab rule. Following the practice of writers who possessed literary taste, he has taken care to colour his description of places with pieces of poetry in which there is a reference to their names. Ordinarily, he ends the description of a place by an account of scholars and other remarkable persons who were born there; and on such occasions, he sometimes enters into very interesting details. This is why the descriptions of certain cities occupy a considerable space in his dictionary. For example, Baghdád occupies six pages and a half in folio of a very compact and close script; Mecca occupies four; Damascus four, etc.

As it should be expected, the Muslim countries are, in general, described with greater detail than the Christian or alien countries. Yáqút was taken away from his mother-country when he was very young and as such he could not know the books written in the West. It is, nevertheless,

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1. كتاب الملحمة . The word *malhama* ordinarily means among the Arabs a prognostic. (See the *Chrestomathie arabe* of M, de. Sacy. ɪ. 2, p. 289). It is applied to almanacs, but only to those which foretell the future. The Jewish traveller Péritsol used it to denote the romance of chivalry. (Hyde, *Syntagma dissertationum*, v. I, p. XVII). Here it appears to me to be related to almanacs used by the Greeks for which one may refer. to *Trésor de Henry Etienne*, ed. Didot. The Greek word signifies an object fixed by the side of another and the sense is not at variance with the Arabic root لحم .

from this dictionary that M. Fraehn has borrowed the extracts of the narrative of Ibn Fadlán and the other beautiful pieces about which we have already spoken.[1] Abu 'l-Fidá' does not appear to have had it at his disposal.

The second dictionary of Yáqút is confined to names which are common to more than one place. Its title is *The Book of Names which are written similarly but signify different Places*.[2] Recently an edition of this book has been published by M. Wüstenfeld from the manuscripts of Vienna and Leyden.[3]

Besides, there exists an abridgment of the big dictionary of Yáqút, the publication of which would be very useful. The compiler of this summary, remarks in his preface that the original treatise was too bulky for the amateurs to handle, and so, in the interest of the geographical science, he had summarized all that was relevant to the subject and had omitted the etymological part which was beyond its scope. He had dropped out the portions dealing with degrees of latitude and longitude as they needed to undergo a fresh examination and lastly, had left out the biographical notes as they could be easily available in suitable biographical works. He further remarks that he had made some additions to certain articles and had corrected the others, either from the observations which he had collected in the course of his voyages or from the opinions of persons who were trustworthy. The additions and corrections made by the abbreviator mostly refer to the province of Baghdád, a territory which was subjected to great changes in the interval particularly after the occupation of the country by

1. The analysis of the big dictionary of Yáqút, inserted here, is borrowed mostly from the description which M. de Fraehn has given in his *Ibn-Foszlan's Berichte*, p. XL, et seq. The book is not available in Paris. See also the *Oxford Catalogue of Oriental Manuscripts*. v. 1. p. 201.

2. كتاب المشترك وضعا و المفترق صقعا . The correct title is : كتاب المشترك وضعاً و المختلف صقعاً ......tr.).

3. *Jacut's Moshtarik*, Gottingen, 1846 in 8°.

the Tartars. The title of this summary is *The Book of Information regarding the Names of Places and Valleys.*[1]

We are not sure about the name of the abbreviator.[a] A copy of the Oxford Library carries the name as 'Abd al-Mu'min Sayf al-Dín ibn 'Abd al-Ḥaq.[2] We learn of a distinguished writer of Baghdád named Sayf al-Dín 'Abd al-Mu'min, son of Fakhr, who flourished towards the end of the 13th century, and who is mostly known as the writer of some books on music.[3] The country where Sayf al-Dín lived, corresponds exactly with the remark in the preface; but the name of his father which is mentioned by Abu'l-Maḥásin does not correspond with the name given in the Oxford manuscript. Furthermore, the period in which Sayf al-Dín lived, does not tally with the period mentioned in the volume. Sayf al-Dín lived towards the end of the 13th century and the volume contains references to events which happened in the beginning of the 15th century. Ḥájí Khalfa who is generally a guide on oriental bibliography, contradicts himself, because on the one hand[4] he mentions an abridgement of the big dictionary of Yáqút by Suyúṭí which could not be completed, as well as another abridgement of the same book which begins like the one with us. On the other hand,[5] he mentions the summary of Suyúṭí with an extract

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1. كتاب مراصد الاطلاع على اسماء الامكنة و البقاع

2. Catalogue of MSS. of Oxford Library, v. 1, p. 107, v. 2 p. 228.

3. Compare the *Minhal al-Ṣáfí* of Abu'l Maḥásin (MS. arabe. Bib. roy. anc. fonds. vol. 4, 91 v. and the book published in Leipzig by M. Kiesewetter under the title *die Musik der Araber*, with a preface by M. de Hammer, 1842, in 4°.

4. Under مراصد الاطلاع in Dic. Bib. Kf.

5. Under معجم البلدان in Dic. Bib. Kf.

(a) The summary referred to here, of Yáqút's dictionary was compiled by Adu 'l-Faḍl 'Abd al-Mu'min ibn 'Abd al Ḥaq Ṣayf al-Dín who died in 1338-1339. It was edited by T. G. J. Juynboll (6 vols, Leyden, 1851-1864). The *Maráṣid* is important because it contains valuable corrections of first hand authority for places in the region around Baghdád.

from the preface which is found in the volume available to us. He reasserts that the summary of Suyúṭí never reached completion, while the summary which is available to us extends upto the last alphabet. Again, Ḥájí Khalfa mentions a summary made by Sayf al-Dín 'Abd al-Mu'min and, making confusion still worse, he mentions still another summary by Yáqút himself and gives it the same title as that of ours.

In the middle of these controversies, one can only make conjectures. My opinion is that the summary in question was written by Yáqút himself. What makes me believe this, is that it could only have been made by a person profoundly well informed in the accounts of early Muslim conquests. I have detected in the articles which refer to Persia, the valley of the Indus and the Punjab, expressions used by al-Baládhurí and the Arab writers of the preceding period. In the beginning of the 15th century some writer of the name of Sayf al-Dín 'Abd al-Mu'min son of 'Abd al-Ḥaq, might have reviewed Yáqút's summary and put it into circulation. Suyúṭi is well known for writing a great number of summaries of this class but one cannot imagine that this summary could have been written by this very prolific writer. Firstly, because, according to the express words of Ḥájí Khalfa, his work had never been completed, and secondly because Suyúṭí was born and lived all his life in Egypt; while in this case, we must search for somebody belonging to the province of Baghdád. Lastly, Suyúṭí was born in 849 A. H. (1445), while this summary must have assumed its final form between 817 A. H. (1415) and the capture of Constantinople by the Turks in 1453.[1]

About the same period, there appeared a historical and geographical description of Africa and Spain, written by Shaykh Muḥi al-Dín Abú Muḥammad 'Abd al-Wáḥid, surnamed al-Murrákushí after the name of Morocco, his

1. Hamaker, *Specimen Catalogi*, p. 68. et seq.

ıther-land. 'Abd al-Wáḥid was born in 581 A. H. (1185) ıd studied at Fez, which had been for a long time the ·incipal seat of scientific learning in western Africa. In ıis period, north-western Africa as well as southern Spain ere subject to the authority of Almohades princes. In)6 A. H. (1210) 'Abd al-Wáḥid crossed the strait (of ibralter) and attended the lectures of the scholars who were ıe glory of Muslim Spain. Thus he had the opportunity of itnessing the last of the glorious days of Islam in Seville ıd Cordova. Some years later he started on a pilgrimage Mecca. He reached Egypt and stayed there for the ›riod 617-619 A. H. (1220-1222), during which time the cruders had swept over the country and captured Damietta. is book which was written in 621 A. H. (1224), is entitled *Marvellous Book giving a Summary of the History of the aghrib.*[1] M. Reinhart-Dozy has recently published an ition of this book from an unique manuscript in the brary of Leyden.[2] Abu 'l-Fidá' has sometimes borrowed ntributions from this book.[a]

During this period, mathematical studies, so useful for perfection of geography, were pursued with great zeal. ıe middle of the 13th century was signalised in the West the mathematical works of Abu 'l-Ḥasan 'Alí of Morocco.[a] keeping with the traditions of the writers of this period, ɔu 'l-Ḥasan travelled extensively. He travelled in Souɘrn and Northern Africa, from the Atlantic Ocean to the ılley of the Nile. We have a book writted by him called *Collection of the elements and the ends.*[3] The first part of

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1. كتاب المعجب في تلخيص اخبار المغرب

2. The title is *The History of the Almohades*, Leyden, 1847. in 8o.

3. جامع المبادي و الغايات

(a) The *Kitáb al-mu 'jib'* is thoroughly uncritical and exceedingly sed in favour of Almohades. Its French translation was published Edmond Fagnan (Algiers : 1893).

See Ges. Ar. Wer. (100, 1881) and Ges. ar. Lit., vol. 1, (322, 1898).

this treatise is devoted to the exposition of elements upon which depend the various branches of astronomy, namely cosmography or the description of the sky and the earth, chronology and gnomonics (dialling). The first three books of the second part almost entirely deal with the instruments used for the measurement of time, and the next four books contain a description of instruments which are purely astronomical, among which one finds several quardants, a sphere, a planisphere, ten kinds of astrolabes, etc. One can appreciate the great importance of these instruments for making observations. Abu'l Ḥasan complains that the instrument-makers of his time neither knew arithmatic nor geometry and they maintained that their art could do without any theoretical notions. That is why he tried to correct the inexact procedures with a view to shorten the operations which were too long and to complete the theories which appeared defective to him.[1]

Unfortunately Abu'l-Ḥasan himself appears to have been rather given to expediency than to scholarship. His descriptions often lack precision, and he apprears not to have taken into account even the results obtained by veritable astronomers like Abul'-Wafá and Ibn-Yúnus. In the second part of his treatise he gives the longitude and latitude of 135 terrestrial places, among which there are

1. In Delambre's *Hist. de l'astronomie en moyen âge*, there is a very correct appreciation of the book of Abu'l-Ḥasan based on the extracts which M. Sedillot Sr. has communicated to him. Those who may like to make a special study of the subject cannot do better than to refer to this extract of Delambre, which offers a complete sketch of the gnomonics of the Arabs in this period and where the graphical methods are transformed in trigonometrical formulae which rendered them very easy to understand. On the other hand, M. Biot, in the first volume of the third edition of his treatise on Physical Astronomy established also with great simplicity the more difficult cases of this type of problem by replacing the geometrical constructions which are sometimes very complex (and on which Delambre depended) by direct and uniform analytical calculation, where different cases are distinguished only by the signs of quantities to which they correspond.

34 where he claims to have made observations himself. The farthest place in the west, which he indicates, is the city of Ofran situated on the shores of the Atlantic, to the south-west of Morocco. Judging from the correct latitudes of places, the latitudes given by Abu'l-Ḥasan are generally too erroneous, and in some cases the error is more than one degree. Similar errors have crept in the determination of longitudes. Moreover, Abu'l-Ḥasan has taken the meridian of the *Cupola of Arin* as the central meridian for his longitudes. This will be discussed in the following section.[a]

The book of Abu'l-Ḥasan is less a treatise of instruments than an exposition of usual astronomical operations; the author replaces mathematical calculations by graphical methods, such as the solar dials and the planisphere. The marking of the meridian line—a fundamental operation of astronomy, is effected by the observation of equal shadows cast by a gnomon. This method was then practised in Syria as well as in Persia.[1] Use was also made of the image of the sun transmitted by a circular hole pierced in a hollow[2]; the Chinese astronomer Kocheou-King, probably inspired by the Arabs, observed the solstices with even greater precision, by forming this image through a needle-eye which was pierced in a disc of metal fixed on forty legs, high above the ground.

Nevertheless, the treatise of Abu'l-Ḥasan has the advantage of filling a considerable gap in the history of science. Moreover, it gives a complete account of the graphic instruments, with the help of which it was possible to do away with mathematical calculations, till the invention of

1. *Mémoire sur l'observatoire de Meragah et sur quelques instruments employés pour y observer*, by Jourdain (*Magasin Encyclopaedique*, 1810).

2. *Mémoire sur l'observatoire de Meragah*, p. 15.

(a) G-A, v. 1, § III.

logarithms made these calculations easier[1].

M. Sedillot Sr. has made a French translation of the first part and the first three books of the second part of Abu'l-Ḥasan's treatise. This translation, which has been done with great care, has been published by M. Sedillot Jr. under the title, *Traité des instruments astronomiques des Arabes.*[2] On the next four books which contain a description of astronomical instruments, M. Sedillot has written a number of small articles, with sketches, in a memoir which appears in the beginning of the first volume of the *recueil des Savants etrangers* published by the *Academie des inscriptions et belles-lettres.*[a]

About the same time, the East produced with pride the work of the celebrated Naṣír al-Dín Abú Já'far Muḥammad, surnamed al-Ṭúsí, since he originally belonged to Ṭús in Khurásán. Naṣír al-Dín was born in the earlier years of the 13th century. Gifted with favourable aptitudes, he cultivated at the same time, many branches of human knowledge, e. g. philosophy, jurisprudence, natural history, geography and mathematics; it is said that he had even studied Greek. He sent a letter to the Caliph of Baghdád which was not received with due regard. He, therefore, bore a hatred against these pontiffs, who had already fallen from the high pedestal of glory which was once theirs. Soon, the Tartars who had made themselves masters of all the northern parts of Asia, crossed the Oxus and penetrated into Persia, overthrowing the Caliphate. Naṣír

1. For this appreciation of the treatise of Abu'l-Ḥasan I have used the two articles published by M. Biot in the *Journal des savant*, Sept. and Oct. 1841.

2. Paris, 1834 and 1835, 2. vols. in 4°.

(a) An unpublished chapter of *Jámi'* was edited by Carra de Vaux under the title; *L'astrolabe lineaire ou baton l'Et Tousi* (*Journal asiatique* [9], vol. 5, 464-516, 1895).

Another good monograph on Arab quadrants is that of Petor Schhmalzl: *Zur Geschichte des Quadranten bei den Araben* (115-126, Munchen, 1929: Isis. 15, 462).

al-Dín attached himself to the cause of the Tartars and obtained the benevolence of Hulakú, their chief. It was at his request that Hulakú founded, at great expense, an observatory in the city of Maragha[a], not far from Tabríz[1]. The foundations of this observatory were laid in the spring of 657 A. H. (1259); Naṣír al-Dín was put in charge of the observatory and it was there that he made all his observations for which his name is famous. He died in 672 A. H. (1274) at the age of 65 lunar years[2].

The numerous books of Naṣír al-Dín testify to his vast knowledge. The orientals reckon him among the top ranking of their scholars and refer to him, sometimes, with the simple title of *Khoja* or 'Doctor'. Naṣír al-Dín perfected many instruments pertaining to mathematics in general and astronomy in particular. He even invented some new ones, and the establishment of the observatory of Marágha opened a new era in this respect.[3]

The astronomical tables which presented the results of his personal observations as well as those of astronomers who were placed under his direction, received the name of *Ílkhánite Tables*[4b] from the title of Ílkhán which was assumed

1. *Memoire* of Jourdain, p. 13 et seq.

2. Compare C-A, vol. v, p. 36 and the *Chronique arabe d'Aboul farage*, p. 548.

3. *Memoire* of Jourdain.

4. زيج ايلخانى

(a) Marágha (=modern Marágheh) is about 70 miles south of Tebriz and overlooks Lake Urmia in Azerbaijan (Iran).

(b) Besides the *Zíj*, Ṭúsí wrote many astronomical treatises, of which the most important is the *Tadhkira* which was very popular in the East for a long time. There are a number of commentaries and super—commentaries on the *Tadhkira* in Arabic, Persian and Turkish.

The *Tadhkira* is a very condensed summary of astronomy and hence difficult to understand. The third chapter deals with the Earth and influences exerted upon it by celestial bodies, geodesy and the account of seas, of seawinds, etc. Extracts from the *Tadhkira* have been published by Carra de Vaux in an appendix to P. Tanner, *Researches sur l'histoire de l'astronomie ancienne* (337-361, Paris 1893).

by the Tartar princes of Persia, and for whom they were prepared. The Bibliothèque royale of Paris possesses a copy which is in the hand-writing of the son of Naṣir al-Din himself.[1] The book is divided in to four parts : the first deals with epochs, the second with the movement of planets the third with the determination of time and the fourth with astrology.

Below is an extract from the preface:

"Scholars have said that observations which cover period of less than 30 years, i. e. the time necessary for a complete revolution of the seven planets, cannot be accurate; for the sake of accurarey thes observations must cover a period of more then 30 years.

"Our sovereign under whose orders the observatory has been founded, has commanded us to try to finish our work within 12 years. We have told him that if fortune would favour us we will 'do our best to fulfil his desire The only observations made before our times, and in which we have confidence, are those of Hipparchus who lived about 1400 years ago, and those of Ptolemy who made observations 285 years after Hipparchus. Next to these come those made by the Muslims; firstly, those which were made by the order of al-Ma'mún about 430 years ago; by al-Battáni in Syria; by Ibn-Yúnus in Cairo; and by Ibn al-'Álam at Baghdád. None of these observations extended over the necessary period of time. The observations which are the most consistent with ours, are those of Ibn Yúnus and Ibn-'Álam. In point of time they are extended over the necessary period of time. The observations which are the most consistent with ours, are those of Ibn Yúnus and al-Álam. In point of time they are nearest to us since the interval between these observations and ours does not exceed 205 years. We have examined

1. Anc. fond. persan, Bib. roy., no. 163.

all the preceding observations and have compared their results with our own".[1]

The *Tables* of Naṣír al-Dín enjoyed, on their appearance, great popularity and the author was placed in the same rank as Ptolemy whose doctrines he was supposed to have improved. These *Tables* reached the heart of Tartary and from there they were carried to China. One even finds in Chinese the names of Persian months, but it is now certain that these tables contained little by way of original observations. The catalogue of stars is a simple reproduction of the catalogue of Ibn Yúnus who had copied Ptolemy, and who in this turn had copied Hipparchus.[2] Naṣír al-Dín confined himself to the reduction of these tables to the meridian of the city of Marágha where he made his observations. Like al-Battání and Ibn Yúnus he had observed only two or three stars and had adopted the others from the *Almagest* of Ptolemy, making necessary corrections for the longitude.[a]

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1. *Memoire* of Jourdain, p. 61 et seq.

2. M. Biot contributed a memoire in the *Journal des Savants* of July 1847, on the plagiarism of Ptolemy.

(a) A large number of writings on many subjects are ascribed to Ṭúsí. He wrote a number of treatises on various aspects of each of the following subjects: 1) Arithmetic 2) Geometry 3) Trigonometry 4) The Observatory and the Library of Marágha 5) Instruments used in Marágha 6) Astronomical tables 7) Astronomical theories, the *Tadhkira* 8) Calendar 9) Astrology 10) Optics 11) Mineralogy 12) Music 13) Geography 14) Theology 15) Philosophy 16) Logic 17) Ethics 18) Poetry, etc.

On (4) above see an excellent note on Marágha in *EI*, vol. 3, 261-266, 1930.

The observatory of Marágha was equipped with the very best instruments, some of which were probably obtained from Baghdád and Alamut. The library is said to have contained 400,000 volumes. It reminds one of the Bayt al-Ḥikma of Baghdád founded by al-Ma'mún and the Dár al-Ḥikma of Cairo organised by al-Ḥákim. On instruments, (5) above, see Hugo J. Seemann: *Die Instrumente der Sternwarte zu Maragha* (*Sitzungsber der Physik med. Sozietat*, vol. 60, 15-126, Erlangen, 1928).

Among the puplis and collaborators of Naṣír al-Dín who acquired some renown, Abu 'l-Fidá mentions Maḥmúd[1] surnamed Quṭb al-Dín or the 'Pillar of Religion'. Maḥmúd was born in Shíráz in 634 A. H. (1236) and performed the functions of Qáḍí in Tebriz. Besides astronomy and jurisprudence he had studied medicine.[a] He died in

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1. G-A, v. II p. 48.

(a) Reinaud ends this chapter rather abruptly. The period under review (i. e. the middle of the 13th century) was one of great intellectual activity in the field of mathematical geography in the East as well as in the West. The stimulus obviously came from Iran and Central Asia where the best astronomers of that age were busy in their observatories. Ṭúsí was one of the greatest figures of that age but it is a pity that his brilliance obscured other lesser geographers and astronomers whose contribution to knowledge is not of a low order. The glamour of Ṭúsí perhaps influenced Reinaud to neglect them altogether.

1. One of these was Mu'ayyad al-Dín al-'Urḍí, Syrian by birth and a contemporary of Ṭúsí. In 1259 he was at Marágha observatory and was one of the four astronomers who worked with Ṭúsí. He was in charge of the instruments section of the observatory where he poduced instruments which were remarkable for their precision.

Al-'Urḍí's main work was a treatise on instruments entitled *Risála fí Kayfiyyat al-irṣád wa má yaḥtaju ilá 'ilmihí wa a'málihí min ṭuruq al-muwaddiya ilá ma'rifat 'audát al-kawákib* in which the following instruments are described :—

(1) Mural quadrant, (2) Armillary sphere, (3) Solstitial armil, (4) Equinoctial armil, (5) Hipparchus's diopetr (alidade), (6) Instrument with two quadrants, (7) Instrument with two limbs, (8) Instrument to determine sines and azimuths, (9) Instrument to determine sines and versed sines, (10) The perfect instrument (the universal instrument), and (11) Parallactic ruler (after Ptolemy).

Another treatise of al-'Urḍí was *Risála fí 'i'mál al-kurra al-kámila* (construction of the perfect sphere).

One of his sons Muḥammad constructed in 1279 a celestial globe composed of two brass hemispheres separated by the ecliptic diameter of 14 cms. and showing the 48 constellations, the equator and the ecliptic (inlaid with gold).

(See Sedillot : *Memoire sur les instruments astronomique des Arabes*, Paris, 1841. On early Arab celestial globes see I. H., II, 1014, 1015).

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710 A. H. (1311).[1]

2. Another astronomer of this period who deserves our attention is Quṭb al-Dín Shírází (1236-1311) to whom Reinaud just made a passing reference. Quṭb al-Din was one of the greatest Persian scientists of all times. He wrote many scientific treatises (some put their number at 400) on a variety of subjects from optics to ṣufism but his main works are *Niháyat al-idrák fí diráyat al-aflák* and *al-Tuḥfat al-Sháhiyya*. They contain remarkable views on astronomical geography, an account of seas, climates, immobility of the Earth and other cosmological views of his times and even give the material for designing a world map.

None of Shírází's works have been edited but reference to his works will be found in:—

E. Wiedemann. *Zu den Optischen Kenntnissen von Qutb al-Din* (*Archiv. für Geschichte Naturwissen schaften*, vol. 3, 187-193, 1911).

EI. vol. 2, 1166-1167, 1928.

Ges. ar. Nat. 148-149, 1840.

Ernest Honigmann: *Die Sieben Klimata* (162, 167, 170, 178 Heidelberg, 1929. Isis. 14, 270-276).

3. A very important work of the same period was the *Bibliographical Dictionary* of Ibn Khallikán (1211-1282) who belonged to Arabela (east of Tigris) and was the chief Qáḍí of Syria in Damascus. He was a professor who lectured in various colleges of Cairo and Damascus.

His great *Dictionary* contains 865 biographies It is one of the most important work of its kind in the world literature. It gives an account of great men of Islam from the 2nd century Hijra to his time. He took considerable pains to give accurate information, e.g. to trace genealogies, to establish the right spelling of names, to indicate the main traits of each personality and illustrate them by anecdotes, to fix the dates of birth and death, etc.

An excellent English translation with abundant notes by Baron de Slane entitled *Ibn Khallikan's Biographical Dictionary* was published in 1842-1871, Paris.

See Ges. Ar. Wer. vol. 28, 139-145, 1881;
Ges. ar. Lit. vol. 1. 326-328, 1898;
EI. vol. 2,. 396, 1918;
and J. E. Sarkis, *Dict. encycl. de bibl. arabe* (98-99, Cairo, 1928).

1. C-A, v. V, p. 242 and Wüstenfeld: *Histoire des medicins arabes*, p. 148. (See also Dic. Bib. Kf. v. 2, p. 229 under التحفة الشاهية

15

IBN SA'ÍD

One of the authors from whom Abu 'l-Fidá has very often borrowed, is Abu 'l-Ḥasan Núr al-Dín 'Alí, commonly known as Ibn Sa'íd from the name of one of his ancestors. He is also known by the surname of al-Gharnáṭí, since he was born at Granada, and that of al-Maghribí or 'the Occidental' on account of the position of Spain in relation to the East. Ibn Sa'íd was born in 610 A. H. (1214). He came of an illustrious family and his father, named Músa, was entrusted with the government of the city of Seville which had not yet fallen into the hands of the Christians. He was educated at Seville up to the complete stage of scholarship. His father was very learned and had attempted to write two histories, one for the East and the other for the West. Before his death, he committed his son to put the finishing touches to them and publish them. Ibn Sa'íd felt duty bound to follow the will of his father, and to discharge this duty more worthily; he resolved to travel to the principal Muslim countries. He visited successively Cairo, Mauṣil, Baghdád, Baṣra, Aleppo and Damascus. He also performed the pilgrimage to Ka'ba and finally returned to the West and died in Tunis, in 673 A. H. (1274).

In Baghdád, Ibn Sa'íd made full use of the libraries of the city which numbered thirty six. In fact this capital had not till then been scourged by the Tartars and it offered quite a good deal of resources. In Aleppo, where he reached between 634 and 658 A. H. (1236-1260), he attracted the attention of the prince of this city, who was a great-grandson of the great Saladin and who, like almost all the other princes of his family, was very much interested in literature. The prince engaged Ibn Sa'íd to make public the fruits of his voyages and studies. Ibn Sa'íd completed the work begun by his father and published two histories, entitled, *A Book on the Peoples of the West*[1] and *A Book on the Peoples of the East*[2].

But the book which must be mentioned here, is the little treatise called *Jughráfiya* or 'Geography'. This treatise, which runs into many chapters, is a simple abridgement of that of al-Idrísí. Like al-Idrísí's book it is divided according to the sequence of seven climes and each clime is subdivided into regions. We have seen that the treatise of al-Idrísí did not contain astronomical positions, and that the maps which were meant to remove this shortcoming were absent in many copies. The chief aim of Ibn Sa'íd appears to have been the elimination of this inconvenience and the dispensation of the original work in a small volume. The name of each place of some importance is accompanied by its longitude. Moreover, since the time of al-Idrísí many new geographical facts had come to light, which Ibn Sa'íd inserted in his work.

1. كتاب المغرب في اخبار اهل المغرب Abu 'l-Fidá mentions this book in his preface as one of those from which he has drawn upon, Fleischer: *Historia anteislamica*, vol. 2 p. 204.

2. كتاب المشرق في اخبار اهل المشرق See the *Manhal al-Safi* of Abu 'l-Maḥásin, man. ar. Bib. roy. ant. fonds, v. IV, p. 166 and also the *History of the Mohammedan dynasties* by M. de Gayangos, vol. 1, p. 309, 327 and 440 and the Catalogue of the Oxford Library, vol. 2, p. 231.

He often mentions a writer called Ibn Fāṭima who had navigated along the western coast of Africa up to Cape Blanco[1] and the eartern coast up to the Land of Sofala[2].[a] Ibn Sa'íd again mentions him in connection with the Sea of Aral and the city of Rome which shows that probably Ibn Fāṭima had prepared a general treatise. We know nothing more about this author.

Ibn Sa'íd did not always work with a critical and discriminating mind. He sometimes confused one clime with another and his own descriptions often lack rigorous exactitude. When Abu 'l-Fidá started writing his treatise he was led away by the occidental origin of Ibn Sa'íd and in respect of the countries of Europe and Africa, he put complete faith in him and followed him in entirety.[b] But subsequently he took note of his inexactitudes and the later version of the treatise of Abu 'l-Fidá is relieved of a number of passages which are found in the autograph manuscript of the Library of Leyden.[3]

The Bibliothèque royale of Paris possesses a copy of the treatise of Ibn Sa'íd which is the same as was used by Abu 'l-Fidá. Hence, wherever Abu 'l-Fidá had read the text badly, it was easy to trace the source of the error. Moreover, this copy appears to be authentic since it assures, in the end, of having been compared with the original.[4]

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1. G-A, II, p. 215.
2. G-A, II, p. 208.
3. Prefece of the textual edition, p. XLI.
4. *Ibid.*, p. XLV. Suppl. arabe, no. 1905.

(a) In modern atlases, on the East African coast, about 20° 12' *S.*, there is a small port called Nova Sofala. *The Country of Sofala* of the Arabs was probably the region around present Beira.

(b) Abu 'l-Fidá writes on Ibn Sa'íd's authority: "There lies the distance of seventy miles between the Mediterranean and the Red Sea from Faramá. Ibn Sa'íd says that 'Amr b. al-'Āṣ wanted to dig the land lying between the two, up to the place known as Dhanb al-Timsáḥ, but Omar disapproved of the plan." (*Taqwím al-Buldán*, p. 106).

The Library of Oxford possesses a copy of the treatise of Ibn Sa'id which is called *A Book on the Extent of the Earth in length and breadth.*[1] In addition to this there is another very voluminous book containing among other things, a number of passages borrowed from the historical and geographical writings of Ibn Sa'id.[2] Some scholars have therefore deduced that there were two versions of the treatise of Ibn Sa'id of which one was more developed. This opinion appears to me to be without foundation. As a matter of fact, the second book consists of two parts, one is attributed to Ibn Isḥáq and the other to Ibn Sa'id. It is not only a treatise of geography, but it also deals with astronomy, history, etc.[3] This is evidently a compilation made by Ibn Isḥáq himself.[a]

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1. كتاب بسط الارض في طولها و العرض Catalogue v. 1., p. 220, no. 1905.

2. *Ibid*., vol. I, p. 188, no. 874,

3. *Ibid.*, v. II, p. 230 and 233.

(a) Parts of Ibn Sa'id's works have been edited but a complete edition of *Bast* still remains unpublished. Some of the published works are :—

K. Vollers: *Fragmenta aus dem Mughrib des Ibn-Sa'id.*

I. *Berichte über die Handschrift und das Leben des Ahmad ibn Tutun von Ibn-Sa'id nach Ibn ed-Daja* (*Semitsche Studien I*, Berlin 1894.

Konrad Miller. *Mappae arabicae,* vol. 1, 1, p. 21, 1926.

Fritz Trummeter: *Ibn-Sa'id's Geschichte der vorislamischen Araber* (p. 67, Stuttgart, 1928).

16

QAZWÍNÍ*

During the period when Ibn Sa'íd traversed the Orient, there was in Mesopotamia, a person who had earned fame as geographer and chiefly as naturalist. He was Zakariyyá

(a) From Qazwíní onward, the title of this book, 'Arab Geography' becomes anomalous. A more suitable title for the remaining part of the book would probably be 'Muslim Geography', for every geographer who has been considered here is a Muslim and all works are not in Arabic. Muslim geographers may hereafter be subdivided into four Schools; each school having its own distinguishing features:

(1) Syrian-Egyptian or Mamlúk; centre, Cairo, (2) 'Iráqí; centre, Baghdád, (3) Persian; centre. Shíráz, (4) Maghribí; centres, Granada and Tunis.

The Mamlúk School was by far the largest and the most important school of Muslim geographers. Most of these geographers wrote voluminous geographical or cosmographical treatises, biographic or geographical encyclopaedias with a mathematical bias. In the field of practical geography perhaps, one of the greatest achievement of this school, in the 14th century, was the Cadastral Survey of Egypt. The Survey was carried on with considerable care and detail. For each village the area, the nature of the soil, its value and taxes were given. It was corrected and modified from time to time. It compares well with the land revenue survey made by Todar Mal in India for Emperor Akbar in the 17th century.

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son of Muḥammad commonly known as al-Qazwini, since he originally belonged to the city of Qazwin or Kasbin in Persia. Qazwini boasted of his descent from Imám Málik son of Anas, who lived in the 8th century of our era and after whose glorious name there exists, even today, in Algeria and in a greater part of Africa, a sect known as Máliki. His family had, for a long time, been in possession of the office of qáḍiship and had produced several distinguished persons. In spite of the fame which he always enjoyed, the Arab biographies are very little concerned about him. He appears to have been born towards the beginning of the 13th century and to have left his home early for Baghdád, the then centre of talent. According to what he himself tells us[1], he reached Damascus in 630 A.H. (1233), where he contacted a mystic writer named Muḥy al-Dín Ibn al-'Arabí.[2] About the same time, he met, probably in Mauṣil, an old teacher of the children of Saladin named Ibn

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The 'Iráqí School was not mentally separated from the Mamlúk group. Here also the popular trend was to write encyclopaedias containing natural history, geography and folklore and absorb other available works on these subjects, sometimes in entirety.

The Persian School specialised mainly in mathematical geography. Their work mainly consists of text-book-type of books or treatises on astronomy, geodesy, physical geography and some regional geography. There are some exceptions, for instance, Ḥamdalláh Mustawfí whose *Nuzhat al-Qulúb*, is an elaborate encyclopaedia on natural history and geography but on different lines than those found in the Western Schools.

The Maghribí School was mostly interested in itineraries which contained accounts of important places, routes, learned men and monuments, etc. Their geography was primarily, if not exclusively, human. There were, however, quite a few writers who composed short monographs on astrolabes, quadrants, octants and other instruments which were in use in those times.

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1. MS. arabe, Bib. roy. suppl. no. 917, fol. 204.

2. Dic. Bib. Kf., v. 4, p. 381 et seq. under الفتوحات المكية and *Catalogue des MSS. orientaux de la Bibl. de Leipzig* by M. Fleischer, p. 490.

al-Athír Diyá al-Dín who, as he tells us, was then very old.[1] According to Abu 'l-Maḥásin, our author who had studied jurisprudence as well as geography and natural sciences, used to perform, under the authority of the Caliph of Baghdád, the duties of Qádí in Wásiṭ on the Tigris and at Hilla on the Euphrates. He died in 682 A.H. (1283)[2]. Ḥájji Khalfa mentions that one of his books which deals with geography was written in 674 A.H. (1275)[3]. According to Casiri, the same book should have been written in 661 A.H. (1263)[4]. Anyway, one can deduce from the remarks of Abu l-Maḥásin that Qazwíní after the capture of Baghdád by the Tartars in 656 A.H. (1258) and the fall of the Caliphate, went into seclusion. It is probably during this period of retirement that he composed his works.

The writings of Qazwíní, although imperfect in themselves give a distinct idea of his scholarship. He has been called the 'Pliny of the Orientals'. The most important of all his works, and the one which has contributed most to earn him reputation is called *The Marvels of Creation and Peculiarities of Existing Things*[5]. It is composed in two parts along with an introduction which is devoted to the general classification of animates and their faculties, on the lines of the Greek philosophers, particularly Aristotle. In the first part the author deals with what he called 'the things above' and in the second with 'the things below'. 'The things above' consist of the sun, the moon, the stars, angels and genii, etc. Besides these, the author speaks of the Arab, the Syrian and the Persian calenders and festivals, etc. This part is very brief. The second part gives the

1. Suppl. Arabe, Bib. roy., No. 917, fol. 117.

2. M. Silvestre de Sacy published the review of Abu'l-Maḥásin in the 2nd ed. of his *Chrestomathie arabe*, v. 3, p. 447.

3. Published edition, v. 1, p. 154.

4. Bibliothéque de l'Escurial, v. 1, p. XIV of the preface, v. 2, p. 5.

5. عجائب المخلوقات و غرائب الموجودات

general picture of the earth and its phenomena. The author successively treats all the elements in general but some of them, for instance, meteors, winds, etc. in particular. Thenceforth he passes on to the division of the earth into seven climes and to the various seas and principal rivers. He explains the causes of earthquakes and discusses the formation of mountains and the origin of rivers, springs and wells. In this part he draws nearer the ideas of modern geologists, like Werner, who are known by the epithet of of Neptunists[a]. Then there follows a description of minerals, plants and animals which occupies only a small part of the book.

There are, in this treatise, a large number of strange facts. The chapter on Man is very well developed, not only from the anatomical but also from the intellectual and moral point of view. The other facts, without being of great importance by themselves, represent the opinion of the orientals of the Middle Ages and bring out some interesting rapproachements with the belief of the ancients and the ideas which then prevailed in Europe. The author has not only utilized the writings of the Greeks, particularly those of Aristotle who in the Middle Ages occupied ,the first place in the Orient as well as in the West, but has also made use of the work of Ibn Síná, al-Bírúní and the narrative of Ibn Faḍlán and cheifly the two works of Abú Ḥámid of Granada, about which we have already spoken.[1] He has also referred to the works of al-Jáḥiẓ and al-Mas'údí, on the marvels of narture and has not forgotten to mention a Persian treatise entitled, like his own, *The Marvels of*

1. G-A. v. II. p. 111. There is, in the library of Oxford, a copy of '*Ajá'ib al-Makhlúqát* which among other modifications is attributed to Abú Ḥámid and where Abú Ḥámid invokes the evidence of Qazwíní. This is evidently the book of a forger, and it is surpising that M. Pusey has been misled here. (See the *Catalogue of Oxford*, v. 2, 227 and 534).

(a) Believers in the origin of rocks generally as chemical precipitates from the sea- opposed to Plutonists or Vulcanists.

Creation, which was written a century before, by Aḥmad of Ṭús[1]. He was not more critical and methodical than Pliny; he classifies rats and hopping mice with insects and regards the monstrous beings as the product of a supernatural power, which are easily explained now by the theories of Geoffroy Saint-Hilaire. Nevertheless, the book is, in its class, a fundamental treatise, and so long as a textual edition[2] is not published there would remain a gap in Arabic literature as known in Europe.[a] The Persians possess a version of this book in their own language, and some select copies of both the versions, found in various libraries, are accompanied by paintings.

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1. Dic. Bib. Kf. v. 4, p. 188. This book is found in the Imperial Library of Vienna and M. de Hammer has published some portions in his book called *Sur les origines russes*, St. Petersberg, 1827, p. 81. See also the Catalogue of Arab, Persian and Turkish MSS. of the Library f M. de Hammer (already mentioned), p. 129. In place of Aḥmad, Hájjí Khalfa names the author as Muḥammad Ibn Maḥmúd.

2. M. Clement-Mullet has been trying for many years to invesate and fill this gap. He is sufficiently competent for this important ork on account of his wide studies in geology and in other branches of atural sciences. One can as well read with pleasure the articles contriuted by the late Chézy in the *Chrestomathie arabe* of M. de Sacy, which e accompanied by notes of M. de Sacy. In this review, I considered necessary to mention on some points the views of this renowned orienlist and other scholars who have spoken of Qazwíní.

(a) The Arabic text of both the works of Qazwíní has been edited F. Wüstenfeld (2 vols. 892 p., Göttingen, 1848-1849), the first being á'ib al-Makhlúqát (Cosmography) and the second the *'Ajá'ib al-Buldán* ography). Wüstenfeld's text of 'Cosmography' is a very arbitrary , probably far removed from the original. It is based mainly, but exclusively, upon a late eighteenth century recension.

The 'Cosmography' has often been printed in the margins of alnirí's *Kitáb al-Ḥayát* (Cairo, 1305, 1309, 1330 H.).

The first half of the 'Cosmography' (Wüstenfeld, I, 1-208) was transd into German by Herman Ethé: *Die Wunder der Schopfung* (644 Leipzig, 1868, with notes by Fleischer).

Julius Ruska: *Das Steinbuch aus der Cosmographie* (Heidelburg r. 1896; Wüstenfeld, 1, 208-245).

Unfortunately this book, just by virtue of its popularity, has invoked a number of difficulties. The manuscripts differ very much with each other; in some, the text is very extensive, in others it is very short; evidently there have been suppressions as well as interpolations of the subject matter. Moreover, it is surprising that in majority of the copies, the style is incorrect and abounds in solecisms. Sometimes the copies are adorned with imaginary pictures; for example, one of the manuscripts, in the chapter on constellations, gives the image of a bird armed with guns.[1] In addition to this there are abridged editions which not only contain unwarranted modifications but have also been published under different titles or under different names. The confusion is so great that the oriental bibliographers have not been able to resolve it and this confusion has been carried over in the works published by the Europeans. I shall now speak of the book of Qazwiní which deals with geography, and then returning to my topic, I shall make some remarks applicable to both the books.

The treatise of geography[a] is called *Monuments of Countries and an Account of their Inhabitants*[2]. This is a kind of dictionary where the names of places are given in alphabetical order, but wheree ach clime forms a separate chapter[b]; thus

1. MS. arabe, Bib. roy. suppl. No. 866 fol. 33.

2. آثار البلاد و اخبار العباد

(a) There are two distinct recensions. The first dated 1262-1263, is entitled *'Ajá'ib al-Buldán*; the second, revised and much enlarged, dated 1275-1276 is entitled *'Áthár al-Bilád wa 'akhbár al-'ibád*. It is a description of the seven climes of the earth.

(b) The climes are the same as those of Eratosthenes or Ptolemy, which have been adopted by most Arab geographers and cartographers. They are in fact latitudinal zones, the limits of which are somewhat arbitrarily determined by the length of the longest day. The first zone, c. 12°, 40′ to 20° 27′, is nearest the equator and corresponds to the shortest day (12¾ hours) and the seventh zone c. 47°20′ to 50°20′ corresponds to the longest day (15¾ hours).

(Contd. on Page 158)

the book is not so easy to use as ordinary dictionaries like the big and small dictionaries of Yáqút. In addition to this, like Yáqút's dictionaries, it is inconvenient, as it deals with each place separately although they belong to the same country. The author says in the preface, that he has disposed, in his book, the result of his studies, as well as what he himself has heard and seem. But the sources of the book are very nearly the same as those of the preceding treatises, and the author invokes the same authorities.[1] As some of the books mentioned therein have not reached us, the book has the advantage of giving such evidences which are not found elsewhere. As the title indicates, the author, on various occasions, relates some biographical and historical anecdotes. Unfortunately he does not show better critical judgment than what one finds in *The Marvels of Creation* and it will be wrong to accept his statements in entirety. An edition of the text is going to be published shortly[2].

This book is found in various libraries under two different titles. In addition to those which carry the title, *Monuments of Countries and an Account of their Inhabitants* there are some which are called simply, *The Marvels of Lands.*

Qazwíní's 'Geography' was translasted in Persian and a summary of it was included in some Turkish versions of the Cosmography'. It was abstracted in 1403-1404 by 'Abd al-Rashíd al-Bákuwí who added the latitude and longitude of the places mentioned in the book. A French translation of al-Bákuwí's summary by Guignes is found in Not. Ext. vol. 2. 386, 545, 1789.

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1. Casiri says (*Bib. de l'Escourial* v. 1, p. XIV of the preface and v. 2, p. 5) that Qazwíní, before writing his treatise, had travelled in Asia and Africa. I am apt to believe that Casiri has been misled here. Qazwíní does not appear to have seen himself any other land except Mesopotamia and Syria besides his mother country.

2. The edition was printed in Göttinger, under the auspices of the German Asiatic Society by the efforts of M. Wüstenfeld. Already the late M. Uylenbroek has published the part which concerns *al-Jibál* in the *Ivacoe persicoe descriptio*, already mentioned, and M. Gildmeister has published the portion which treats India in the first part of *Screptodum de rebus indicis laci et opuscula.*

ıave compared the copies belonging to either of these two egories, which are found in the Bibliothèque royale and ım convinced that basically they are the same; but the ıies which carry the *Title, the Marvels of Lands*, contain reat number of biographical notes. For example, it is y in the copies of the latter category that I have come oss the indication of an interview which the author had Damascus with Shaykh Muḥy al-Dín al-'Arabí. Likewise, ı article devoted to the city of Qazwín is accompanied with ıny notes which are not found in the book entitled *Monunts*.[1] It is difficult to discern whether these additions ı in another person's handwriting or that of Qazwíní's. I, ırefore, hold the view that the book, *Marvels of Lands*, , new edition of that of *Monuments* and that the author ht have published it under the new title, in order to ng it in greater harmony with the *Marvels of Creation* ich had become exceedingly popular. The one had for object geography in its proper sense, the other embraced ; entire nature.[2a]

I now come to the remarks to which I referred earlier. ɜ majority of the copies of Qazwíní's writings are attributed an author named Zakariyyá ibn Muḥammad ibn Maḥmúd; t they sometime carry the name, Muḥammad ibn Maḥmúd d sometimes, Muḥammad ibn Muḥammad. Abu 'l-Maḥásin, the small paragraph which he has devoted to Qazwíní, ıls him Muḥammad ibn Maḥmúd. One therefore wonders

1. See the edition of M. Uylenbroek, p. 45 of the text.
2. The inverse order must be admitted if, as Casiri says, the : of *Marvels of Lands* had been written in 661 A. H. and if, Ḥájjí Khalfa says, the book *Monuments*, had been written in 674 A.H.

(a) See the article on *Iqlím* by H. T. Weir in *EI*. (vol. 2, 460,)) and Ernst Honigmann: *Die Sieben Klimata* (Heidelberg. 1929). vol. 2, 841-844, 1925.

Julius Ruska: *Qazwinestudien* (*Der Islam*, vol. 4, 14-66, 236-262,). There is neither an English translation of Qazwíní's 'Cosmoɔhy' and 'Geography', nor a systematic analysis of scientific wledge contained in his works. Also see, Math. Ast. Ar. 182, 1902).

if these diverse statements pertained to many generations of the same family. I feel certain that the name of the author was Zakariyyá ibn Muḥammad ibn Maḥmúd and in my opinion, the note of Abu 'l-Maḥásin is deficient due to the omission of a degree; such cases are not uncommon in oriental genealogies. Here are my proofs. Qazwíní, in his book on *Monuments*, gives the name of father as Muḥammad.[1] The following words appear in the beginning of the magnificent copy of *The Marvels of Creation* which had been copied in the lifetime of the author, by a physician who appears to have worked under his patronage. "The book of *Marvels of Creation*.........one of the works of our Master, dispenser of favours, the Shaykh of his times, the pillar of the world and the religion, Zakariyyá, ibn Muḥammad, ibn Maḥmúd al-Qazwíní, Qáḍí of Wásiṭ in 'Iráq and of its dependencies. May God honour his services and increase his power in consideration of Muḥammad and of his holy family.[2]" In the end it read: "Written... . by Muḥammad ibn Muḥammad ibn 'Alí al-Dimashqí, physician, at present resident......of 'Iráq .....the year 678 A.H. (1279)[3]." Lastly the author of the Persian geographical treatise called *Nuzhat al-Qulúb* may be taken as authentic, since he flourished in the first part of the 14th century and who was born at Qazwín too. This author, in his preface mentions among the sources from which he has drawn, the book of *Marvels of Creation* and that of *Monuments* and *Áthár al-Bilád*, and he names the author as Zakariyyá ibn Muḥammad ibn Maḥmúd, the Kamúniyan.

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1. Ed. Uylenbroek : p. 44 of the text.

2. كتاب عجائب المخلوقات .... من تصانيف مولانا مولى النعم الصاحب شيخ و قته عماد الدنيا والدين زكريا بن محمد بن محمود القزويني الكموني قاضي واسط العراق و اعمالها اعزالله نصرة و ضاعف قدرة بمحمد واله الطاهرين

3. كتبه...... محمد بن محمد بن علي الدمشقي المتطبب الساكن يومئذ... العراق سنة ثمان و سبعين و ستماية هلاليه -

The title al-Kamúní has raised further controversy. In some manuscripts this word is altered, and the Rev. d'Herbelot has read it as al-Kúfí or 'a person belonging to the city of Kúfa'. This title is derived from the name of Qazwíní's family which was one of the topmost in Qazwín.[1] We have now arrived to the times of Abu 'l-Fidá.

1. Ḥamdalláh Qazwíní : *Ta'rikh-i Guzida.*

Persian MS. Bib. roy. fonds. Gentil. No. 15. The family of Qazwíní was extinct when the Persian author was writing.

17

ABU 'L-FIDÁ[a]

[Abu 'l-Fidá Ismá'íl ibn 'Alí ibn Maḥmúd ibn Sháhinsháh ibn Ayyúb, 'Imád al-Dín al-Ayyúbí, a Syrian prince, was a historian and geographer. He was born in Nov. 1273 in Damascus, where his father al-Malik al-Afḍal, a brother of the Prince of Ḥamát, al-Malik al-Manṣúr (a branch of Egyptian Ayyúbites) fled with his family from the Mongols. In the service of his uncle he began his military career in the latter's feuds against the Crusaders. After the death of his cousin Maḥmúd II, he entered the service of Sulṭán al-Malik al-Náṣir. Only when he had served for twelve years, he was installed as governor of Ḥamát Two years later, when he was on a visit to Cairo, he received the rank of Prince and the title of al-Malik al-Ṣáliḥ. He died on the 27th Oct. 1331 at Ḥamát.

His fame, however, is mostly based on his literary works, the most important of which are his *History of the World* and his *Geography*. The former under the title : *Mukhtaṣar Ta'ríkh al-Bashạr* deals with pre-Islamic history

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(a) For the sake of convenience and to keep up the continuity of the history of Arab Geography, this chapter on the life and work of Abu 'l-Fidá is added here. It is an abridgment of G—A., vols. I. d IV, [illegible] nd I[illegible]. (under Abu 'l-Fid[illegible]).

and that of Islam down to 1329. His geography, *Taqwim al-Buldán* which is one of the most elaborate treatises on Arab Geography, deals with cosmography and the description of 28 regions of the world.

It may be mentioned at once that the *Taqwim* does not reveal an original character except in some of its parts. The author did not himself see many parts of the world beyond Syria, Egypt and a portion of Arabia and 'Iráq. But, for the countries which he could not visit himsef, he made use of treatises written before his own. The principal of these treatises were the narratives of al-Iṣṭakhrí and Ibn Ḥauqal; the two works of al-Idrísí including the bigger treatise which is lost; *Qánún al-Mas'údí* of al-Bírúní, the first part of which is found in the Oxford Library; the treatise of Ibn Sa'íd, the copy which belongs to the Bibliothèque royale of Paris; lastly, the treatises called *Al-'Azízí* and the *Book of Longitudes and Latitudes* as well as the Arabic translation of the *Geography* of Ptolemy done under the partonage of al-Ma'mún, and the *Lubáb* of Ibn al-Athír.

Sometimes Abu 'l-Fidá invokes the evidence of contemporary travellers. For India, for example, he used the information furnished by a person who visited this country and this information permitted him to give a brief description of this land which in general, is fairly correct.

It appears that from the beginning, Abu 'l-Fidá based his work on mathematical notions. His treatise is not like al-Idrísí's work, arranged according to climes. The author had regard to the division brought about by the differences of language and political revolutions, and every place, however insignificant, is accompanied by an indication of its longitude and latitude.

The following is the plan of the book. It will be seen that besides the absence of geographical maps, it is an imitation of the Greek book of Ptolemy :

The treatise is preceded by general observations where he has mentioned the plan followed by him, the values of linear measures, the division of the world in climes, seas, lakes, rivers, mountains, etc. The prefatory matter occupies nearly one sixth of the whole book. The rest of the book consists of descriptions which are classified according to countries equivalent to as many chapters (28 in number). Ptolemy also gave an example of such classification. Abu 'l-Fidá extended it by allotting more space to historical and geographical descriptions.

Abu 'l-Fidá begins his descriptions with Arabia and puts the two cities of Mecca and Medina in the beginning of this chapter. From Arabia, he passes on to Egypt and Maghrib. Then he deals with Spain and some Islands of the western seas. After these he describes successively, Syria and countries situated in the East up to China. The last two chapters are devoted to the regions situated between the tropics and to the Northern countries of Europe and Asia. This division has not been taken into account in the published edition of the text or in Reinaud's translation.

In the manuscript these descriptions are disposed in a tabular form. The tables are presented on double pages and each page on the right side is divided into 10 columns. The first column, proceeding from right to left, contains the serial number; the second contains the name of the place to which the whole row is devoted; the third, the source from where the author has drawn his information; the fourth and fifth, the degrees of longitude with minutes; the sixth and seventh, the degrees of latitude with minutes; the eighth, the astronomical clime; the ninth, the country to which the place belongs; lastly, in the tenth column there is the particular orthography of the name. The left hand page is devoted to corresponding descriptions.

Abu 'l-Fidá took pains in acquainting himself with the different systems of geographical science prevalent

among the Arabs, systems which had their origin in the Greek and the Roman Schools of Geography. In many cases, he has to make a choice in the midst of these divergences. Thus, for the configuration of Africa he chooses the ideas of Eratosthenes and Strabo !· He has nowhere analysed these different systems, and in general, never tells us why he accepted one opinion rather than the other. How much simplified would the task of the scholars have been had Abu 'l-Fidá entered into some explanations ?

Abu 'l-Fidá ordinarily reckons his degrees of longitude from the African coast. This procedure implies a difference of 10° from the meridian of the Fortunate Islands. But sometimes, without even mentioning it his longitudes begin from the Fortunate Islands.

For every place of some importance, Abu 'l-Fidá gives the opinions of the principal geographers on its longitude and latitude, but often these divergences, instead of clarifying things, only cause embarrassment. The author would have done better by giving a rigorous account of the point of view of each and every author whose evidence he invoked and by reassembling these different opinions into a general point of view. He boasts in his preface to have taken great care in placing each station in its correct clime. If he meant by this that he has fixed the clime of every place according to the latitude which he attributed to it, one may agree to his claim. But it is doubtful if he had means at his disposal to ascertain the correctness of latitudes.

Abu 'l-Fidá possessed a vast and varied knowledge including that of mathematics but he does not appear to have been in a position to make celestial observations. In the article on Ḥamát, the chief town of his principality, he adds to the longitude and the latitude of this city, the word *muḥaqqaq* (verified); but this isolated instace does not prove that this particular observation was made by Abu 'l-Fidá himself.

Other methods besides astronomical observations have long been used by ancient and modern geographers for determining the position of different places on the surface of the earth. One place more or less properly determined served to fix the position of serveral others. Often this was effected by referring to accounts of routes. The number of *farsakhs* travelled gave the number of degrees as the number of degrees sometimes gave the number of *farsakhs*. Abu 'l-Fidá established the longitude and latitude of certain places by means of what he calls *qiyás* (induction). In such cases he has deduced the position of a number of places from those of the others. Not only does he proceed according to his own inductions, but he sometimes invokes the induction of Ibn Sa'íd.

The manuscripts of Abu 'l-Fidá's works which have reached us show that the author reviewed more than once what he had accomplished. The principal changes which distinguish his last writing from the autograph manuscript (preserved in the Library of Leiden) are the sequence in which the different places of one and the same country are placed. In the autograph manuscript the places appear to be distributed without any sequence. In the later work they proceed from West to East, in the longitudinal sense and from South to North in the latitudinal sense. In Spain, for example, the author begins his descriptions from the cities situated on the Atlantic Ocean and for the two places situated on the same meridian he takes first the southernmost and then proceeds to the North. This is a logical order to which one cannot refuse approval. This is the same order as adopted by Ptolemy. By adopting this sequence it was easy for Abu 'l-Fidá to report the different numbers of longitude and latitude attributed to a particular city and to record his own choice in the beginning. This was a means of expressing one's opinion without having need to enter into any controversy. In some cases, however, the numbers are reported in a haphazard way. In order to remedy this inconvenience as far

as possible, Reinaud has given in italics the number which appeared to him to correspond to the idea of the author.

Reinaud has gone further. In the edition of the Arabic text he has inserted at the end of each chapter, certain passages which are found in the autograph manuscript but which the author left only in his later copy. He has interpolated every passage in the chapter to which it pertained, in the place indicated by the context.

These critical remarks, which bear mainly on the pattern of the work, do not minimize in any way the richness of the groundwork and do not prevent one from remarking that the geography of Abu'l-Fidá, like the treatise of Idrísí, is a capital work of its class. Europe did not produce in the Middle Ages, a single treatise which can be compared to it. The defects which we attribute to the author are evidently related to the eminent position which he occupied and to the *gravity of circumstances in whose midst* he found himself. He did not want that any person other than himself should put his hand on this what he regarded as a monument of his glory, and cares of all kinds with which he was surrounded did not allow him to submit his book to a definitive writing. Abu 'l-Fidá is distinguished by two qualities which few geographers in the West and the East have combined to the same degree. His serious and positive disposition restrained him from absurd writings which surcharged many accounts of the Middle Ages. Besides, he had the luck, on all fundamental questions, to range on the side of correctness and truth.

We have seen that his treatise, from the time of its first appearance, earned general esteem in the East. A little after the death of the author, it was abridged by Dhahabí a very prolific writer who is known by several enterprises of the same type. Later on, the work was rendered in the form of a dictionary and accompanied by some additions. The editor was Mullá Muḥammad son of

'Alí, surnamed Sipáhízáde, a former Qáḍí of Constantinople, who died in 1558. The same writer then abridged this edition and reproduced it in the Turkish language.

The work of Abu 'l-Fidá has also been imitated in Persian and the imitation has been published under the same title. The title of the original treatise is *Taqwím al-Buldán* which signifies a "Synoptic Sketch or Outline of Countries". The word *Taqwím* has been applied successively to the work of different types written in a tabular form. It has served to designate certain astronomical tables, as well as the treatises of medicine where diseases and their remedies were recorded in a particular form. In the first part of the 17th century, a writer called Miyán Muḥammad Ṣádiq and surnamed Iṣfahání composed two treatises of general geography and since in one of them the latitude and longitude of different places were arranged in some tables, the author gave it the title of *Taqwím al-Buldán.* For writing this treatise the author used the writings of Naṣír al-Dín, Abu 'l-Fidá and Ulúgh Beg, but unfortunately he had only imperfect ideas of mathematical geography and his opinions cannot be taken seriously.

A Latin translation of the treatise of Abu 'l-Fidá was attempted in the first part of the 17th century by Schickard but this translation was very imperfect and never saw the light. Greaves published, some years later the text and translation of the chapters on Arabia and the countries around the Oxus. In the beginning of the 18th century Gagnier began a complete edition of the text accompanied by a Latin version and notes, but it did not go beyond the chapter on Arabia. In the same period, a Maronite priest called 'Askarí, attached to the Bibliothèque royale of Paris executed a Latin translation of the whole book, but, judging from some pieces here and there, 'Askarí was a stranger to geographical science and his work appears to be very defective.

Reiske, who acquired a just reputation for his knowledge

of the Arabic language, undertook a Latin translation of the treatise of Abu 'l-Fidá in Leiden in 1746. This translation was published in 1770 and 1771 in volumes 4 and 5 of the *Magasin de Busching*. Reiske himself declared that he took 45 days to do this translation. Such rapidity by a man of Reiske's capacity had an advantage, i. e. the continuity of ideas in the whole of the book, but it does not leave a margin to rise to original research. Besides, Reiske was a stranger to mathematical data, which occupy a fundamental place in the original treatise].

18

THE CONTEMPORARIES OF ABU 'L-FIDÁ

It has been mentioned in the previous chapter that there were some members of the family of Muhanna who had established direct relations with Abu 'l-Fidá and who, by the knowledge they had acquired about Mesopotamia and other countries, supplied him considerable information. Among the contemporaries of Abu 'l-Fidá we can also mention certain persons,, some of whom had probably personal relations with him, and who, by their writings did considerable service to geography.

One of these was Shams al-Dín Abú 'Abdalláh Muḥammad, surnamed al-Dimashqí since, he originally belonged to the city of Damascus. Shams al-Dín professed súfism, but this did not prevent him from performing the functions of the Imám in the village of Raboue in the suburbs of Damascus. In his old age he retired to the city of Safad,[a] not far from Mt. Thabor,[b] where he died in 727 A. H. (1327) at the age of 73 lunar years. Shams al-Dín had received a varied education; he also wrote poetry and some of his verses had been inspired by the beautiful environs of Damascus.

We are indebted to Shams al-Dín for a book called *The Choice Things of the Age on the Marvels of Lands and Seas.*[1]

1. نخبة الدهر في عجائب البر و البحر

(a) Safad is a small town in Israel about 30 miles north-east of Haifa.

(b) Tabor is the Biblical name of the mountain east of Nazareth and south-west of lake Tiberias, Israel.

This book which forms a small volume *in-folio*, is divided into nine chapters which are subdivided into 75 sections. The first chapter deals with the form of the earth, its length and breadth, the seven climes, the diversity of seasons and lastly the monuments of the past, such as the Pyramids, etc. The second chapter is devoted to minerals. In the third, the author describes the rivers, springs and wells which have historical importance. The fourth chapter deals with water, the manner in which it is distributed around the continents and the important islands that rise above it. In the fifth, he speaks of the Mediterranean Sea and of the port of Alexandria, etc. The sixth chapter contains the description of the southern sea. The seventh chapter deals with Persia, India, etc. The eighth is devoted to Africa and Europe. Lastly, in the ninth chapter is found the table of the diverse nations of the earth according to how they were descended from Sam, Ham or Japheth. This book contains considerable matter which could be subjected to criticism, but one finds in it many facts which are not found elsewhere[a]; it has been utilized by many writers and I myself have often mentioned it in the explanations which accompany my translation.[1b].

The second contemporary of Abu 'l-Fidá was Shiháb al-Dín surnamed al-Nuwayrí, from the name of the Egyptian village of Nuwayr where he was born. Al-Nuwayrí died in Cairo in 732 A. H. (1332), the same year as Abu'l-Fidá; he was then 50 lunar years old[2].

1. This book is found in the Bib. roy, anc. fond no, 581. The beginning of the volume is missing. On the other hand, the copies of Leyden and St. Peptersberg, just like the brief description given by Hájjí Khalífa of both in his Dictionary, carry wrong dates. M. Fraehn and other scholars who have spoken of this book have made the author live nearly two centuries later. What I have mentioned here is derived from the History of Hasn bin 'Umar (*Bib. roy. anc. fond. MS. arab.* no. 688 fol. 83 v).

2. *Manhal al-Ṣáfí*, t. 1. fol. 75,

(a) For the first time in Arab Geography we find in the last chapter of this book a reference to the influence of environment on the life of people—an idea which was further developed later on by Ibn Khaldún.

(Continued)

Al-Nuwayrí has left for us a kind of encyclopaedia, a form of writing which was customary in a period when books were rare and consequently very expensive. The title of the book is: *All that one can desire to know in the different branches of belles-lettres*[a]. It was written for Malik al-Náṣir the Sulṭán of Egypt, who had shown much benevolence to Abu 'l-Fidá. This book which runs into several volumes is divided in five *fanns* or parts. The portion which is devoted to geography forms the first *fann*, which may be summarised as follows: The creation of the world; the meteors and the elements; the various measures of times and seasons; the earth, its dimensions, its division into seven climes, mountains, seas and islands, rivers and lakes; lastly, the physiognomy of every country and that of its inhabitants, the monuments which decorate it and the 'stations' found therein. The second part deals with man in general, his good and bad qualities, and the manner of government, etc. In the third part is found a description of animals which inhabit the earth, alongside man—that is to say—the quadrupeds, the birds, fishes and insects. The fourth *fann* is devoted to botany, while the fifth is entirely historical; and, judging by some of the incomplete volumes which the Bibliothèque royale possesses, it is a source of trustworthy and abundant information.[1b]

(*Continued*)

(b) The Arabic text of *Nukhbat* was edited by August Ferdinand Mehren (St. Pétersburg 1866). Mehren published a French translation of the same works: *Manuel de la Cosmographi du Moyen Age*, Copenhagen, 1874).

See: Ges. ar. Lit (2,130, 138, 1902 Suppl. 2,161, 1938). Honigmann, *Die Sieben Klimata* (Heidelburg 1929)

1. On the *Encycl.* of Nuwayrí as a whole see the analysis which Reiske has given from a copy available in the Library of Leyden, in his *Prodidagmata and Hadji Khalfa Tabulas*. See also the description of Syria by Abul-Fidá edited by Koehler, p. 232.

(a) نهاية الارب في فنون الادب

(b) A complete edition of the *Niháyat* was prepared by Ahmad (*Continued*)

A book very similar to the Encyclopaedia of al-Nuwayrí, and written about the same time and in the same country was that of Abu 'l-'Abbás Aḥmad Shiháb al-Dín surnamed al-Dimashqí, because his family was established in Damascus, and also al-'Umarí because he traced his origin to Caliph 'Umar, one of the chief architects of the Muslim Empire. His family occupied, for a long time, a high rank in the court of the Sulṭáns of Egypt and Syria. The father of al-'Umarí, i. e. Qáḍí Muḥy al-Dín Yáḥyá performed successively the functions of minister in the court of Baybars and Qala'ún Sultáns and was more than once in charge of important affairs. He died in Cairo in 738 A. H. (1338) at the age of more than 93 lunar years.

Al-'Umarí was born in the beginning of the 14th century and had studied at Damascus as well as at Cairo. He was attached to the Chancellory of Damascus in the service of his father, who performed the functions of secretary for secret dispatches. Later, when his father was put by Sultán Malik al-Náṣir at the head of the secret Chancellory of Egypt, it was he who used to read the despatches to the Prince. He acted, so to say, for his father who on account of his old age, was not in a position to discharge his duties. But in 737 A. H. (1337) when the Sultán was displeased with him, he was replaced by his brother 'Alí and was exiled to Damascus, where he died in 749 A.H. (1349) at the age of fifty lunar years.

Al-'Umarí had always shown a great liking for literature, particularly poetry which so much suited the taste of hi

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(*Continued*)

Zakí Páshá (d. 1934) who collected photographs of all the scattered MSS., some of them being holographs, and deposited them in the Roya Library in Cairo. On the basis of these documents, the Dár al-Kutul began the publication of a beautiful edition in 1923/24 when vols. 1 to 8 appeared. There will be in all some 24 volumes of which 14 have so far been issued.

See the review of the first three volumes by F. Krenkow (J R.A. pp. 769-72. 1925).

See also Ges. ar. Lit. (2, 139, 1902 and Suppl. 2,173, 1938).

time. He was in contact with he son of Nobata and other friends of Abu 'l-Fidá who were interested in literature and who, among themselves, tried their wits. His family continued to occupy an honourable place in the government and the writers of this period have successively mentioned his brother, his nephew and his grand-nephew among the Secretaries of State of the Sulṭáns[1].

The Encyclopaedia of al-'Umarí is called *Routes of the Sights in the Kingdoms of the Countries*[2]. It was written in 27 volumes which in a depleted condition are found in the Bibliothèque royale.[3] The 23rd volume, which pertains to the historical section is, in general, the reproduction, word by word of the *History* of Abu'l-Fidá. Such borrowings or to be more precise, plagiarism, were very common before the invention of the printing press. In the 3rd volume, the author has included the first six chapters on geographical descriptions. These chapters are devoted to Egypt and to different countries of Asia. Although much had already been written about these regions, yet these chapters contain a large number of new facts; one cannot fail to notice, however, that the author did not take advantage of the position occupied by him for a long time at the court of the Sulṭáns of Egypt and Syria[3b].

1. See the *Manhal al-Ṣáfí* of Abu'l-Maḥásin, man. arab. Bib. roy. anc. fond. t. 1. fol. 90 v. and 146; t. 4 fol. 196 and t. 5 fol. 176 v.

2. Anc. fond. nos. 583, 642, and 904, 1371 and 1372. vol. 15 is found in the *Bib. de L'Escurial*, but Casiri (t. 1. p. 68 et t. 2 p. 6) is mistaken about the period when the author lived, and about the place of his birth and of his death.

3. M. Quatremére has given a review of this part (i. e. Asia) in t. 13. *Not. Ext.* The volume where it is found now occupies no. 583 of anc. fond. arab.; formerly it occupied no. 782. of anc fond arab. Among the titles which accompany the name of the author is that of al-Marráshí. Ibn al-Wardí of whom it will be said shortly, mentions in the preface of his geographical treatise, among the sources from where

(Continued)

The fourth writer contemporary to Abu'l-Fidá was also a Syrian by birth. He was Abú Ḥafṣ 'Umar surnamed Zayn al-Din or the 'Ornament of the Religion', commonly known by another surname, Ibn al-Wardí. He studied at Ḥamáh near Aleppo and excelled in jurisprudence, philology and poetry. In his younger days he functioned as a *Ná'ib* or Lieutenant to the officer in charge of law and order in Aleppo. Later, he left his magisterial career to devote himself entirely to the culture of letters. His taste of Poetry was like a second nature to him. It is said that one day when he, along with other magistrates, was called upon to declare the sale of a farm, he improvised a deed in verse in which he mentioned the names of the buyer and the seller, the supporters and witnesses, etc. The style of this composition of a new type was so remarkable that it evoked general admiration. Ibn al-Wardí died at Aleppo in 747 A. H. (1349) at the age of

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(*Continued*)

he has drawn, a book named المسالك والممالك والأكاري or *The Routes and Countries* by Marákushí, that is to say, a person belonging to Morocco; and Ḥájjí Khalífá on the authority of Ibn al-Wardí has mentioned this title in the Dic. Bib. Pétis de la Croix, the person who had brought the book from Levant, did not hesitate to change al-Marráshí to al-Marrákushí (*Histoire de Gengis-Khan*, p. 544) and his opinion is shared by Deguignes and Casiri. But it is very difficult to admit that al-'Umarí's Encyclopaedia was used by Ibn al-Wardí, and probably here some other book is meant.

3. Abu'l-Maḥásin : *Manhal al-Ṣáfí*. man. Arab. Bib. roy. anc. fond. t. iv fol. 194. v. and no. 688 of anc. fond. fol. 263 sqq.

(a) مسالك الابصار في ممالك الامصار

(b) 'Umarí's work, *Masálik*, contains an elaborate description of of lands, institutions and manners of India, and similar descriptions relating to other Muslim countries, which is interesting to compare with the accounts of his contemporary *Ibn Baṭṭúṭa*.

One of the most valuable parts of al-'Umarí's geography is the one dealing with Abyssinia, the Kingdom of Fez, Tlemcen and Tunis and the Negro Empire of Mali in the western Sudan.

The late Ahmad Zakí Pásha collected photographs of MSS. of the *Masálik* and reconstructed a complete copy of which he edited one volume only. (National Library, Cairo, 1924).

a little more than 60 lunar years. He had friendly relations with 'Umarí as well as Abu'l-Fidá' and his biographies include some pieces of poetry for each of them.(a)

A great number of books are attributed to Ibn al-Wardí but none of his writings is of much importance. He wrote in verse, a treatise on jurisprudence, an attempt which had already been made by Abu'l-Fidá. He also wrote a summary of the *History* of Abu'l-Fidá. Lastly, we owe to him a treatise of geography called *Kharídat al-'Ajá'ib*. This book which was originally written for a governor of Aleppo called Sháhín and which is still popular in the East, consists of 14 chapters. Following is the summary of the chapters: The various countries of the earth; the straits and the seas; the islands and peculiar things found thereupon; some important rivers, springs and wells; mines and precious stones; forests, trees, plants, fruits, cereals and vegetables; quadrupeds and birds.

The book begins with some cosmogonic details in harmony with the common notions and ends with a chapter on the signs of the end of the world and the general resurrection. This is, in general, a reproduction of the notions which were current among persons who loved marvels and mysteries and it would be in vain to go into these works in search of a critical approach and erudition. However, the book is one which is often mentioned in Europe. The illustrious Deguignes has given a very extensive review

(a) There is some confusion here with regard to the name Ibn al-Wardí, for there were two different persons of the same name who followed each other at an interval of about a century, i. e. :—

1. Zayn al Dín Abú Hafs 'Umar ibn al-Muzaffar ibn al-Wardí al-Quraishí al-Bakrí al-Ma'arrí al-Sháfi'í (d. 1349).

2. Siráj al-Dín Abú Hafs 'Umar ibn Muhammad ibn al-Wardí al-Quraishí al-Bakrí al-Ma'arrí al Halabí (d. 1457).

The al-Wardí mentioned in this paragraph is the former one. Reinaud has wrongly ascribed *Kharídat al-'Ajá'ib* to him. *Kharídat* was actually composed by the latter about a century later and has nothing to do with Abu'l-Fidá's work. The *Kharídat*, given in some detail by Reinaud in the next pragraph, is literally a reproduction of the greater part of *Jámi' al-Funún* of Ibn-Shabíb, written in about 1332.

on it in vol. 2 of the *Notices et extraits* (des MSS. Bib. roy.) and many of its textual extracts have been published [1].

A fifth contemporary of Abu 'l -Fidá was Ḥamdalláh, surnamed al-Qazwíní as he was born at Qazwín in Persia; he is also called Mustawfí or the 'president of finances', apparently because one of his ancestors was endowed with this title. Ḥamdalláh wrote about 70 A. H. (1330) and

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1. Particularly the piece printed in Upsal in 1835 by the effort of M. Tornberg. Tornberg has reproduced the general map which is placed in the beginning of the treatise and which Deguignes had omitted. This map, for which the author has borrowed from those of Iṣṭakhrí and Ibn Ḥauqal is very inferior to that which was made in the same period by Sanudo, partly from Arab sources and which has been inserted in the 'Collection of Bongars'.

(a) Rather two histories. The other being *Zafarnáma* which was meant to be a continuation of the *Sháhnáma* of Firdúsí. This historical poem of Mustawfí begins with the life of the Prophet and extends up to 1331 and is one-fourth longer than that of Firdúsi's.

(b) The *Nuzhat al-qulúb* (Delight of the hearts) was completed by Mustawfí in 1340, at the request of friends who felt the need of a work of this kind--cosmography and scientific encyclopaedia. As Reinaud has pointed out, it contains a preface and three *Maqálas* and an appendix (*Khátima*).

The Preface (or *Fátiha*) gives an account of the sphere, heavenly bodies and elements, the inhabited quater of the globe; longitude, latitude and climates.

The third *Maqála* deals with geography.

It is divided into 4 parts :

(1) The holy cities and the temple of Jerusalem.

(2) Descript:on Irán (in great detail).

(3) Other countries bordering on Irán which were sometime included in it.

(4) Countries which have never been part of Irán..

It also gives a Table of the azimuths of Qibla from different places.

(E. J. W. Gibb Memorial Series. Old Series no. XXIII, 1915. The Geographical part of *Nuzhat al-qulúb*), edited by G. Le Strange.

Complete *Nuzhat al-qulúb* was published in Bombay in 1893/4. It is a lithograph edition and is very poor.

died in 750 A.H. (1344). Besides a history entitled *Ta'rikh-i Guzida* which is really a remarkable book, he has written a treatise on geography called *Nuzhat al-qulúb* This is a collection of observations pertaining to physics, astronomy and geography. The book consists of a Preface, three chapters (*Maqálas*) and a conclusion. The Preface first of all deals with skies, stars, seasons and periods; then comes a description of the earth in general, with the definition of longitude and latitude and the division of the earth in seven climes. In the first chapter, he deals with minerals, vegetation and animals; and in this connection he has mentioned the *Martichore*, a fabulous animal described in the narrative of Ctesias. This description only confirms the persistence of popular fancies and prejudices. The second chapter is devoted to man in particular. This is a sort of an anatomical treatise sufficiently enlarged. The third is a sketch of the principal cities of Persia with their longitude and latitude, their horoscopes, etc. The two books of Ḥamdalláh are written in Persian and of these the second one has never been very popular.

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IBN BAṬṬÚṬA

Lastly in the same period, the world was traversed from west to east and from north to south by a man, who even surpassed Ibn Ḥauqal and Mas'údí and who, though he did not have that much knowledge and skill, turned, his attention on a very vast theatre. He was Abú 'Abdallâh Muḥammad better known by his surname Ibn Baṭṭúṭa, who was born about the beginning of the 14th century in Tangier at the entrance of the Mediterranean. He was of Berber origin and was not an Arab; he was educated in Muslim religion and had learnt since his childhood the ideas of the conquerors. Goaded by the desire of seeing new countries, he left his homeland in 725 A. H. (1325) and proceeded towards the East. He visited successively Egypt, Syria, Persia, Arabia, Zanzibár, Asia Minor. the empire of the Qipchaq[a] then occupied by the descendants of Chingiz Khán; Constantinople Khwárizm, Bukhárá, India, the Maldives, the Islands of Ceylon and Sumatra and China. In India,[b] at the court of the Sulṭán of Delhi[c] and then in the Maldives he performed,

(a) Qipchaq Steppes beyond the Caspian.

(b) In India he was often called Mauláná Badr al-Dín.

(c) Muhammad ibn Tughluq (ruled A.D. 1325-1351).

for some time, the functions of a qáḍí. After an absence of more than twenty years, on his return journey to his mother country he took advantage of the proximity of the southern part of Spain which happened to be the glory of the Muslim Empire, and where the court of Granada served as the centre of attraction for the best talent and visited that part of the earth. Some time later, the sovereign of Morocco intended to send a deputa-to the Prince of Mali on the banks of the Niger and he selected Ibn Baṭṭúṭa to perform this mission. On this occasion he explored a part of the interior of Africa and advanced up to Timbuctu. On his return, he fixed his residence in Fez, where he got himself engaged in the work of communicating to posterity the facts which had made great impression on him. This took place in the year 756 A. H. (1335). Ibn Baṭṭúṭa passed the rest of his life in ease and comfort and died in 779 A. H. (1377). The narrative of his voyages is entitled: *A present to the observers on the peculiarities of cities and marvels of voyages.*[1]

Ibn Baṭṭuṭa does not himself seem to have written the narrative which carries his name. It was not because he lacked education. His studies in jurisprudence, which enabled him to perform the functions of the qáḍí in a great capital, support the view that he was educated, but like the great Marco Polo, he was not endowed with patience necessary for putting in order the abundant facts of different names, places and persons, and so the memoirs of his adventures were recorded by dictation. This dictation was then put in order by a certain professional writer and therefore his narrative, like that of Marco Polo, often lacked the precision of details The writer mentioned above was Muḥammad ibn Juzayy al-Kalbí, originally of Granada, and known for some of his own writings. This narrative was finally abridged by Muḥammad al-Baylúní who suppressed some of the legends and omitted some of the details.

1. تحفة النظار في غرائب الامصار و عجائب الاسفار *Journal Asiatique*, March, 1843, p. 182 et seq. (Mémoir of M. de Slane).

Here is an extract of the preface of the original narrative. These are the words of the writer :

"Among the meritorious persons who presented themselves at the court of our sovereign (the Sulṭán of Morocco, Abú 'Inán) was a great traveller, a person of renowned veracity, the jurist Abú 'Abdalláh Muḥammad, originally of the tribe of Luwáta and native of Tangier ; he was generally known by the name of Ibn Baṭṭúṭa and he had been distinguished in the countries of the East by the title of Sham al-Dín (Sun of the Faith). On reaching the noble court he laid down the staff of travelling (i.e. renounced to undertake new journeys), and the Sulṭán loaded him with favours to make him forget the past for the present and even the memory of what he had suffered in his long journeys. His Majesty ordered him to dictate to a scribe the description of the cities which he had visited, the anecdotes and histories which he could himself recollect, the reviews on the kings whom he had seen, as well as on the scholars whom he had encountered, and the holy and distinguished personages whom he had met. Accordingly, Ibn Baṭṭúṭa dictated such things and descriptions as would interest and charm the imagination of man, etc. His Majesty then addressed a command to his humble and very devoted servant Muḥammad ibn Juzayy al-Kalbí (May Gold help him to accomplish his task and to free himself from the debt of gratitude for all the favours which he has received !), ordering him to assembles together the pieces dictated by Shaykh Abú 'Abdalláh and then to compile a treatise which should include all the useful information which he had furnished, and which should render perfectly intelligible all the ideas he wanted to communicate. The writer should take care to correct the style and to put the writing in proper sequence, all the time aiming at clarity and simplicity. I hastened to obey, and having begun with the help of God, I have expressed the ideas of Abú 'Abdalláh in such terms as may be quite understandable and have brought to light the thought of the author ; at times I have preserved even identical expres-

sions used by him, without making the slightest change. I reproduced all the histories and anecdotes since he himself seemed to be assured and convinced about those facts. To contribute further to the authenticity of this work, I have fixed the orthography of the names of persons and places which are mentioned there, and have explained all the strange words, as far as it had been possible for me to do so. Otherwis, the unusal form of these words have been embarrassing for the reader and persons who would be inclined to explain them according to the rules of analogy would have been faced with much difficulty."[1]

The Bibliothèque royale possesses four copies of the ori ginal writing. The second part of one of these copies appears to have been in the handwriting of Ibn Juzayy.[2] M. le Baron de Slane has published, in the *Journal Asiatique,*[3] the portion which deals with the travels of Ibn Baṭṭúṭa in the interior of Africa. The same collection[4] consists of the text and the translation of the chapter devoted to the Islands of Sumatra and Java, by M. Édouard Dulaurier. At present, a Portuguese translation of the whole narrative is being published in Lisbon by the late P. Santo-Antonio Moura.[5] Unfortunately P. Moura, already known for his Portuguese version of the Arabic History of Carthage was a stranger to the science of geography, and a certain number of passages are badly interpreted and many of the names of places are mutilated.

The abridged edition has been translated by M. Samuel Lee, Professor of oriental languages at the Cambridge

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1. *Journal Asiatique,* March, 1843, p. 243 et seq. (Translation of M. de Slane).

2. *Journal Asiatique,* March, 1843, p. 241 et seq (see no. 907 of the suppl. arab. Bib. roy).

3. March, 1843. p. 181 et seq.

4. February and March, 1847.

5. The first volume of this translatioon appeared in 1840 under the title of *Viagens extensas end dilatadas do celebre Arabe Abu-Abdallah, mais conhecido pelo nome de Ben-Batuta.*

University.[1] To Mr. Lee, only the copies of the abridgment were available, and in these copies several places were altered. But Mr. Lee was quite prepared to do research on and ascertain as many facts as possible. Moreover, he has taken pains to consult different books in Arabic and Persian which treat analogous matters.[2]

Ibn Baṭṭúṭa was by nature credulous and open to belief in the most absurd stories. Moreover, we have seen that he himself never wrote and that the narrative was written from memory. Furthermore, according to his own statement, once in the course of his travels, the ship which had sailed from Calicut and was taking him to China, was wrecked and he could save nothing but his own person[3]. One would naturally demand what credit his assertions merit? Had he really seen the countries which he says he had visited? And even in the countries which he did visit, did he truly accomplish the task imposed on a conscientious traveller? There is one remarkable thing, however, that Ibn Khaldún, who, a few years after the death of Ibn Baṭṭúṭa travelled in all directions in the realms of Tunis, Algiers and Morocco, and who, by himself, was in a position to see the more important personalities of these countries, says that he was not entirely convinced of the veracity of the traveller, Ibn Baṭṭúṭa.

Ibn Baṭṭúṭa who enters into great details about China, and who speaks of Peking in such terms as if he had visited the place, does not actually appear to have gone beyond the coasts. At least, what he says about the interior of the country does not accord with facts. In other parts of his narrative, the errors of details are very pronounced; [4] but in

1. *The travels of Ibn-Batuta*, London, 1829 in 4°. This volume appeared under the auspices of the English Committee of Oriental Translations.

2. I have re-established in my copy of M. Lee's Translation the names of places which have been altered. My intention was to insert all of them here, but it would be outside the scope of the the work I have undertaken.

3. Translation of M. Lee, p. 172.

4. *Journal Asiatique*, Sept. 1846, p. 217 (Remarks of M. Dulaurier).

general, he appears in good faith and his narrative deserves the fame which it has acquired in Europe from the moment when it came to be known there. The traveller Burckhardt deserves merit for having drawn attention for the first time to the book. [1]

The voyages of Ibn Baṭṭúṭa embraced the entire extent of the Muslim countries, and were even continued beyond. He narrated some singular examples of the manner in which the Arabs still surrounded by the prestige of their ancient glory, continued to spread out to distant places of the then known world. In Alexandria, at the time of his first voyage, Ibn Baṭṭúṭa had the occasion to see one of the meditating monks of Islam, who claimed the power to perform miracles. This ṣúfí said to him "you must go to visit one of my brothers who dwells in India, and the other one who lives in China." Ibn Baṭṭúṭa whose way of life much resembled that of the ṣúfís, recognised, in fact, both these persons in the regions which had been indicated to him. One notices some analogous facts in the narrative of the voyages of Vasco de Gama and his companions on the eastern coasts of Africa and in the regions of India.

During the time of Ibn Baṭṭúṭa as in the 9th century, the Muslims in China used to have in the principal maritime cities, a qáḍí and a shaykh or chief of their faith. In the extreme eastern part of China, Ibn Baṭṭúṭa met a friend of his childhood who had been born at Ceuta. Like him, this man was employed at the court of Delhi; then he went to China where he amassed great wealth. Later on, Ibn Baṭṭúṭa met the brother of this very individual in the interior of Africa and consequently he remarked "what a distance that separates these two brothers!" From this incident we may assume that Abu 'l-Fidá and other writers did sometime have correct notions even about those regions which

1. See a note at the end in his "Travels in Nubia," p. 533, et seq; the copies on which M.Lee has worked come from Burckhardt. Previously Seetzen had carried a copy to Gotha.

did not have direct connection with Syria, and which appear to have been closed to all kinds of investigation.

With Ibn Baṭṭûṭa[a] ends the list of writers who could have

(a) It is interesting to realize that the greatest travellers of Islam as well as of Christianity, though belonging to different generations, were contemporaries. Marco Polo died in 1324 and at that time Ibn Baṭṭûṭa was 20 years old and ready to begin his adventurous career.

It would be best to follow the routes taken and places visited by Ibn Baṭṭûṭa in this long journey to the Far East and then to W. Africa and Spain on the four maps included in Gibb's translation (1924). He travelled for about 25 years and covered more than 75,000 miles.

Ibn Baṭṭûṭa's point of view was never that of a geographer or a historian, nevertheless his account has considerable geographical and historical value. In many cases he is the earliest authority to describe a country in detail. His descriptions are in general full of interest. He is quick in noticing the salient points—the manners, customs, the traits and traditions of peoples he comes across. He describes their festivals, commercial relations, means of communication, industries and resources. He was not so much interested in nature as in human beings. There are many facts of anthropological interest in his work, some of which appear in it for the first time, but his descriptions of nature are very poor and often absent. Whenever he reached a city, his first concern was to visit the learned men and the religious men, then the people in authority whose vicissitudes he describes. He may also discuss social conditions and organization of the government, but pays little attention to landscape, climate or monuments (even the great temple of Luxor interested him the least !).

In his study of women he had the advantage of being able to marry them and he was very uxorious indeed throughout his travels. In addition, he bought concubines, and had thus the best opportunities for becoming familiar with the characteristics of women of various races

Next to this, his main trait was his deep religiousness. He was credulous like most pilgrims and tells many pious anecdotes, accounts of miracles, etc.

There are many manuscripts of the *Riḥla* available in various libraries (five of them in Bib. Nat. Paris).

The text of a Persian MS. (an abbreviated edition) was first published by Samuel Lee (1829) and a Portuguese version (1840-55) by Moura, to which Reinaud has referred.

(*Continued*)

some connection, direct or indirect with Abu 'l-Fidá. I cannot carry on this historical review very far without going beyond the scope of my subject. However, the number of oriental authors, who after Abu 'l-Fidá occupied themselves with geography is far from numerous. I should however mention some of them in the following pages but I shall confine myself to short sketches only.[a]

(Continued)

The first edition of the complete Arabic text by C. Defrémery and B. R. Sanguinetti was published by the *Societe Asiatique* in 5 vols. (Paris 1853-54). There are various reprints of the Arabic Text, both western and oriental. Besides, there exist:

(a) Partial German translation by Hans von Mzik entitled: *Die Reisen des Ibn Batuta durch Indien und China* (490 p. Hamburg 1911 ; *Der Islam* 4, 483-438).

(b) French extracts in Ferrand (2, 426-58, 1914).

(c) Urdu translation entitled; *'Safarnáma Ibn Baṭṭūṭa*, 2 vols. (سفرنامہ ابن بطوطہ).

(d) English translation with notes and introduction by H. A. R. Gibb : *Ibn Battúta, Travels in Asia and Africa* (London 1929).

(a) It is surprising that, Reinaud, while mentioning other geographers subsequent to Abú'l-Fidá did not devote even a paragraph to Ibn Khaldún's scientific works. Not only the History of Arab Geography but also the History of geographical science would be incomplete if we ignore the contribution made by Ibn Khaldún who could well be called the founder of rational geography. The masterpiece of 'Abd al-Raḥmán Ibn Khaldún (Tunis, 1332-Cairo, 1406) is his *Muqaddima* which forms the first part of *Kitáb al-'ibar*. The other two parts being the history of the Arabs and other nations and the history of the Berbers and of the Muslim dynasties of North Africa.

The *Muqaddima* deals with the description and discussion of human society in its various aspects (such as nomadic and sedentary life, means of livelihood, sciences and arts, social causes and results). It is divided into six sections :—

1. On Civilization, Geography and Anthropology.

2. Discussion of nomadic culture and its contrast with the sedentary culture ("the desert and the town"), sociological and historical causes and consequences of the conflicts arising continually from that fundamental opposition.

(Continued)

In the beginning of the 9th century A. H., i.e. the

(Continued)

3. Dynasties, kingdom, caliphate, etc.
4. Life in villages and cities. How should cities be organised ?
5. Professions, means of livelihood.
6. Classification of sciences.

In the geographical section of his *Muqaddima* Ibn Khaldún deals with the shape of the Earth and the distribution of land and water. He exploded the old theory regarding the *Encircling Ocean.*

He maintained that the Northern Hemisphere is more densely populated than the southern and also that the population is meagre about the Equator, but away from the Equator there are greater concentrations of population up to the 64th parallel. Further away there is once again very little or no population at all. The reason, according to him, is the varying inclination of sun's rays, and consequently the insolation, according to latitude. Thus, the constancy of overhead sun at the Equator and its migration twice in a year accounts for the excessive heat of the equatorial belt and this is a discouraging factor in human settlement. A harmonious blending of heat and cold in the temperate regions is conducive to human growth and settlement. Away from the temperate regions the excessive cold of the polar areas is once again deterrent to human growth and settlement.

His study of 'Man and Environment' is very interesting. He holds the view that "dearth and abundanced do effect man and animals in their character and development. Given an environment in which there is dearth of food, man is thoughtful and cautious, his physique stronger and proportionate, his manners active and alert, and he stands in contrast to a man living in regions of plenty and easy means".

About the origin of settlements, his analysis is very sound. "Those who settle are attracted by the fertility of land and the seas with which they can defend themselves against other men. In course of time the population increases, and so too the pressure on land. Various handicrafts begin to develop and it becomes a permanent settlement. The settlements grow in course of time and become cities—which show a definite social and economic structure in ways of division of labour, dearth and abundance, supply and demand. The roots of all cities have always been these small settlements at some time or the other.

Ibn Khaldún tries to explain various human activities with the help of environment. He explains why the Arabs are nomads and why the negroes of easy disposition; again why the pigment of skin is different in different lands, etc. etc.

Ibn Khaldún's writings were immediately appreciated. His works

(Continued)

15th century 'Abd al-Rashíd b. Sálih surnamed al-Bákú because he originally belonged to Bákú on the shores of the Caspian Sea, wrote a description of the earth entitle *A summary exposition of the monuments and marvels of omnipotent king.*[1] It is a book of geography[a] arran according to the order of the seven climates. It is imitation of the book *Monuments* by Qazwíní and is writ in Arabic. Deguignes has analysed it in the second volu of the *Notices et extraits.*[2]

There is a History of Persia and Transoxiana writ in Persian, in the last part of the 15th century 'Abd al-Razzáq surnamed al-Samarqandí. This book wh carries the title: *Rise of the two auspicious stars and conflue of the two seas*[3], covers the period of 161 years fr

(*Continued*)

were translated into various languages. The present interest and p in Ibn Khaldún which may be witnessed in every Arab cou and is an intrinsic part of the Arab renaissance is to some exte result of his discovery and praise by western scholars. The admira felt in the modern Arabic world for Ibn Khaldún is especially markable because of the latter's very outspoken criticism of Arabs.

Many extracts from Ibn Khaldún were published by Silvestr Sacy (in his *Chrestomathie arabe*, Paris 1806). The first com edition of the whole *Kitáb al-'ibar* was published in 7 vols. at Bu Cairo (1867). A new revised edition in 7 vols. is being prepare Shakib Arslan (Cairo). The first edition of the *Muqaddima* was lished by M. Quatremére (3 vols. Not. Ext. Paris 1858). There many oriental editions of the *Muqaddima*.

The Turkish translation of the *Muqaddima* was edited by Pir and completed in 1860.

1. كتاب تلخيص الآثار و عجائب الملك القهار

2. One knows what an honoured name did Deguignes mak himself in Science. But then I shall not refrain from observing the knowledge of Arabic was feeble and that he almost entirely igr Persian; besides, in the period when he wrote some of the reso were not available as they are now. Also the reviews on Bákúwí Ibn al-Wardí, by Deguignes, leave much to be desired.

3. مطلع السعدين و مجمع البحرين

(a) Al-Bákúwí compiled an Arabic summary of the geograp al-Qazwíní although he frequently adds the longitude and latitu places which are lacking in Qazwíní's book. It is in the form of a ionary divided in seven parts according to climates. He gives

the beginning of the 14th century up to the time when the author lived. There is in the Bibliothèque royale, a French translation in MS form by the famous Galland. Interesting in various aspects, it is particularly so as a book of geography, on account of certain portions included therein. The author, describing the reign of Sháh Rukh son of Tamerlane, mentions various letters exchanged between Sháh Rukh and the Emperor of China between 1408 and 1420. He speaks of a solemn mission sent by Sháh Rukh and other princes to the court of Peking in 823 A. H. (1420). Then, the author relates the mission of which he himself was in charge sent to the Hindu King of Calicut in 846 A. H. (1442) and he also described the journey which he made to the court of the King of Bíjápúr—another Hindu King in Southern India.

In 1786, Chambers published, in Calcutta, in the *Asiatic Miscellany*, the Persian text and an English translation of the letters which had been exchanged between Sháh Rukh and the Emperor of China, while M. Langlès has reproduced these letters in French.[1] In 1762 M. Thevenot published in the fourth part of his "Collection of voyages" that portion of the translation of Galland which gives a report of the embassy sent by Sháh Rukh to the court of Peking, and this piece was reproduced elsewhere. On the other hand, Langlès included in the first volume of his small "Collection of Voyages"[2] the chapter of the book of 'Abd al-Razzáq which includes the narrative of his embassy to India, and Langlès in this publication, takes help from the translation of Galland. Finally, M. Quatremère has reproduced, in an extensive review on the book of 'Abd al-Razáq the narrative of the embassies of India and China, with Persian text and French translation.[3] Inspite of the

1. *Mémoires relatifs á l'état de l'Inde*, by M. Hastings, enlarged edition of the reciprocal embassies of a king of Persia and an emperor of China; Paris, 1786, in-8°.

2. Paris, an VI, in-18.

3. Not. Ext. t. 14.

concurrence of Galland, Chambers, Langlés and Quatremère, the narrative is far from being as clear as it should be. I shall return to this in the next (volume).[1]

The son of Sháh Rukh named Ulúgh Beg did not inherit the political talents of his father. But, although, he was an imprudent prince, he left for himself the reputation of a great astronomer. Even in the lifetime of his father, he had an observatory constructed at Samarqand, the Capital of his government, and provided this establishment with all the facilities that a prince was capable of giving. He undertook to make a new catalogue of stars as it had not been done since Hipparchus. This time he took pains to observe every star very carefully. Moreover, the new catalogue frequently disregarded even the preceding works of the same type. This is the only catalogue of Ulúgh Beg which was in the East for fixing the latitude and

1. Here I have to raise certain points, not dealt by M. Quatremére, and which should be understood by the reader. The embassy sent by Sháh Rukh to China, set out from Samarqand on the 10th Safar, 823 A.H. (25 Feb. 1420). It arrived in Peking on the 8th Dhu 'l Hijja, 823 A. H. (17th December). It returned in the middle of Jumáda I, 824 A. H. (May 1421), and arrived at the banks of Jaxartes towards the end of the month of Rajab, 825 A. H. (July, 1422). As to the mission of the author in India, he boarded a ship at the port of of Kalhat in Arabia in the beginning of Jumáda II, 846 A. H. (October 1442) and arrived at Calicut after 18 days of sea journey. In the beginning of Dhu 'l Hijja (April 443), he started for Bijánagar, and remained there up to the 12th Sha'bán, 847 (beginning of December). Going by sea to disembark at Mangalore, he passed by the port of Pandarane—the same in which Vasco de Gama anchored and on which one can consult the Portuguese narratives of Barros and Casthenheda. The festival which M. Quatremére, on account of a bad reading of the MS., called *Mahanadi*, is that of *Mahánavamí* which is still celebrated by the Hindus of that country. (See the book of Abbé Dubois, called *Moeurs des peuples de l'Inde*, t. 2, p. 329 et seq). This festival took place on the 1st of Rajab (25 October 1943). 'Abd al-Razzáq left India on 8 Dhu l-'Qa'd (1st March 1444) and disembarked on the coast of Oman in the city of Khúrfaqán, which name M. Quatremére has made unrecognisable in the form of *Djourkaan* in the text and translation.

longitude of cities and for compiling the almanacs.[1] The works of Ulúgh Beg, which took shape in the first half of the 15th century, were in Persian from which an Arabic version was made. The Bibliothèque royale possesses the text and the translation.[2] As regards the astronomical notions of the Chinese, Ulúgh Beg copied out what was already given in the tables of Naṣír al-Dín. It will not be out of place to mention that Ulúgh Beg believed in forensic astrology and that his beliefs were not without influence upon the events which led to his fall.[a]

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1. In 1650 and the following years, Greaves and Hyde Published different parts of the tables of Ulúgh Beg under the title of *Epochae celebriores astronomis binae tabulae, etc.* M. Sédillot (Jr) has announced the publication of a complete edition of these tables. Meanwhile, he has published the text of the preface with notes and variants and an introduction, Paris, 1847.

2. See the Dic. Bib. Kf. t. 3, p. 559, under زيج الوغ بيك

(a) With Ulúgh Beg, practically ends the medieval school of Arab mathematical geography and astronomy in the East; the Western Centres faded out earlier. It will be interesting to compare their results in this field with those of their predecessors (and successors as well). Such a comparison may enable us to develop the correct perspective for the evaluation of their scientific knowledge. Let us take the obliquity of the ecliptic (a fundamental fact of astronomy) as our example:

Table of values of obliquity of the ecliptic at different periods

Observators	Time	Place	Value observed	Error	Authority
(1) Indian astronomers	?	India	24°-0-0″	?	Bernard's History of Indian Astronomy.
(2) Tcheon Kong (Regent of China)	1100 B.C.	China	23°-54′-25″	+ 4′·36″	Only altitudes of the two solstices were observed (*Vide* Grant's History),
(3) Eudemes	350 B.C.	Rhodes	24°-0′-0″	+15′-13″	*Vide* J. Ellard's *Astronomical Essays.*
(4) Eratosthenes	230 B.C.	Alexandria	23°-51′-13″	+ 7′·22″	*Vide* Grant's History.
(5) Hipparchus	130 B.C.	Rhodes	23°-51′-20″	+12′·19″	Ptolmey's *Syntaxis.*
(6) Ptolmey	140	Alexandria	23°-51′-20″	+10′-23″	Ptolmey's *Syntaxis.*
(7) Yaḥyá ibn abí Manṣúr	829	Shammasia (Baghdad)	23°-33′-0″	— 2′·32″	al-Bírúní
(8) Khálid ibn 'Abd al-Malik al-Máwardí	832	Damascus	23°·33′·52″	— 1′·40″	,,

(Table Contd.) :—

	Observators	Time	Place	Value observed	Error	Authority
(9)	Sulaymán ibn Asmá	...	Balkh	23°·33′·42″	...	al-Bírúní
(10)	Banú Músá	860	Baghdad	23°·35′·0″	—0′·18″	"
(11)	Al-Battání	880	Riqqa (Syria)	23°·35′·0″	—0′·13″	*Zíj al-Ṣábi'í*
(12)	Ibn al-'Álam	960	Baghdad	23°·34′·2″	—0′·29″	Nallino
(13)	Ṣúfí	965	Shíráz	(1) 23·°35′·0″	+0′·29″	(1) According to al-Bírúní
				(2) 23°·33′45″	—0′·46″	(2) According to Nallino
(14)	Abú Maḥmúd	c.990	Rey	23°·32′·21″	—1′·56″	al-Bírúní
(15)	Ibn Yúnus	1001	Cairo	23°·34′·52″	—0′·40″	Nallino
(16)	Al-Bírúní	1019	Ghazna	23·35′·0″	+0′·57″	al-Bírúní
(17)	Tables of Alphonso	1250	Toledo	23°32′·29″	—1′·25″	Nallino
(18)	Naṣír al-Dín al-Ṭúsí	1270	Marágha	23°·30′·0″	—2′·5″	Commentary on Tadhkira by Barjandí
(19)	Ibn Sháṭír	1363	Damascus	23°·31′·0″	—0′·22″	Nallino
(20)	Ulúgh Beg	1437	Samarqand	23°·30′·17″	—0′·28″	Zíj Ulúgh Beg
(21)	Walthurst	c.1500	Germany	23°·29′·47″	—0′·29″	R. Grant
(22)	Tycho Brahe	1581		23°·29′·0″	—0′·38″	"
(23)	Khairullah Shírází	1721	Delhi	23°·28′·0″	—0′·38″	Zíj Muḥammad Sháhí
(24)	Bradley	c.1750		23°·28′·18″	—0′·10″	R. Grant
(25)	Delambre	c.1800		23°·28·0″	+0′·6″	Chauvenot's Spherical Astronomy.

There is an Arab treatise on cosmography written in Egypt in 922 A. H. (1516) by Muḥammad b. Aḥmad b. Ayáz, a descendant of those Circassians who, originally, were sold as salves or Mamlúks, but later on came into power in the ancient land of the Pharaohs. This treatise is called *The perfume of flowers in the marvels of universe*[1]. One sees from its date, that in the period when it was composed not only the Portuguese had accomplished the detour of Africa but also a new world had been discovered by Christopher Columbus. It appears that the news had either failed to reach the author or that subjugated by his fixed ideas, he was not inclined to believe others. His book is mostly devoted to Egypt, but it includes a general description of of the world and one is surprised to find the following remarks about the Atlantic Ocean : "It is called the 'Gloomy Sea'; the water is turbid, and people do not venture to hazard there on account of the difficulty of navigation". M. Langlès has included some extracts from this book in the eighth volume of *Notices et Extraits.*

The narrowness of ideas, which unfortunately is so characteristic of Ibn Ayáz, stands as the index of the narrowing interest of the orientals in the scientific researches and investigations during those centuries. It has been said that as the European explorations expanded and extended the horizons of knowledge, the orientals more and more confined themselves to dogmas and half truths which remained characteristic of them for a very long time. But the writer who is going to be considered now by us is an exception to the above statement.

20

SÍDÍ 'ALÍ CELEBI

We know the spirit of enterprise and the ambitious plans of the Ottoman empire in the 15th century. The ascendancy of the Crescent was especially perceptible in the 16th century under the reign of Sulaymán the Great. Whilst this prince conquered Hungary and besieged Vienna, he also inflicted a defeat on the King of Persia, and established his rule over Algiers, Tunis, Cairo, Mecca and Yeman. as far as the coast of the Persian Gulf. In the same period the Portuguese ships carried their victorious standard not only to the coast of India, but also in some parts of the Persian Gulf and the Red Sea—the two seas which had always been considered by the Muslims as their own dependencies right from the beginning of Islam: The pride of Sulaymán was irritated by what he regarded as an audacious sacrilege and he started to chase the Portuguese[1].

It was then the year 1553. The Ottoman *Flotilla* found itself exposed to horrible tempests and only a part of the equipment could reach the land. The admiral whose name was Sídí 'Alí Celebi managed to save a part of the Ottoman *Flotilla*. Before assuming the command, Sídí 'Alí was

1. *Histoire de l'empire Ottoman* of M. de Hammer, French translation by M. Hellert. t. 6, p. 184, et seq.

above all, known as a poet and a man of letters. But he was bestowed with an energetic character and searched for knowledge wherever it could be found. Landing in India, he travelled to the principal cities, contacting the learned persons and collecting all the Arab, Persian and Turkish books which dealt with the art of navigation. Finally, he returned to Constantinople, crossing Northern India, Badakhshan, Transoxiana, Khwárizm and Persia.

Sídí 'Alí has written in Turkish a narrative of the expedition which was under his command, and this account which carries the title: *Mirror of the lands*[1] has been translated into German and French[2]. He has also written in Turkish a treatise on the navigation of the Oriental seas which is a book of very great importance. He was then in Ahmedabad in Gujerat and it was the year 962 A. H. (1554). This treatise, called *al-Muḥíṭ*[3], does not exist in Paris, but the celebrated M. de Hammer, who possessed a copy, published some extracts from it in English, in the Journal of the Asiatic Society of Calcutta[4]. I have found other extracts of the text in the grand treatise of Geography of Ḥájí Khalfa called *Jihán-numá*[5]. The following pages would reveal that I have utilized a number of these extracts. The author made use of the narratives published by the Europeans in that period. Moreover, this part interests us still more considerably because he has utilized

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1. مرآة الممالك

2. For the French translation, see the *Journal Asiatique*, 1826, t. 9. The French version has been made by M. Moris, from the German version of M. Diez.

3. المحيط

4. J. A. S. B. 1834. v. 3, p. 546 sqq. 1836, v. 5, p. 441 sqq. 1837, v. 6, p. 805 sqq. 1838, v. 7, p. 767 sqq. v. 8, p. 823 sqq. See also the Catalogue of Arabic, Persian and Turkish MSS. of the Library of M. de Hammer, Vienna, 1840, p. 168.

5. P. 59 sqq. of the printed edition.

diverse Arab treatises which have not reached us.[a] Of these treatises, which are ten in number, three are old while seven are modern. The three old ones had as their authors : Layth ibn Kahlán; Muhammad ibn Shádán and Sahl ibn Abbán. Of the seven of more recent date, five had been written by Sulaymán ibn Ahmad, a native of the city of al-Shahr in Southern Arabia[1]. Sulaymán wrote in 917 A. H. (1511).

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1. Their titles are : عمدة المهرة ; حاوية ; فوائد or *the Pillar of Mahra*, the name of a province of northern Arabia, تحفة الفحول being the summary of the preceding work; and finally منهاج الفاخر في علم البحر الزاخر or *Method of him who prides himself on knowing the foaming sea.*

(a) Arab navigators for a long time kept the knowledge of winds, navigational astronomy, location of islands and coast lines a secret which was passed on from one generation to the other, within their family. All navigators possessed the following equipment: an instrument for finding the altitude of heavenly bodies (e. g. a kind of astrolabe or *Ṣafiḥa.)* a map of the coast and islands of the sea in which the navigator specialised and a wind-rose. On the map mentioned above, were marked various routes from one port to the other. Such a map with sailing directions (or portolan) was called a Compass by the navigators of the Mediterranean Sea and *Ráhnáma* by those of the Persian Gulf and Arabian Sea. (*Ráhnáma* was later distorted to *Rahmānī* (رهمانى) by the Arabs : *al-Fawā'id*, p. 3).

These *Ráhnámas* laid the foundation of Arab works on the art of navigation. Ibn Májid whose achievements will be mentioned in the next paragraph, saw a *Ráhnáma* of Layth ibn Kahlán. Similar *Ráhnámas* of Muhammad ibn Shádán and Sahl ibn Abbán were also utilized by later Arab writers discussed in this Chapter by Reinaud. Ibn Májid in his *Ḥáwiyat al-ikhtiṣár* mentions :

و نظم تاليف ابن كهلان - و سهل و الليث بن ابان
ذوى النهى و مصلحون الشان - زخرف ربى لهم العجلان

It is also known that another navigator named Ahmad ibn Tírawayh wrote a few mongraphs on navigation in the beginning of the 11th century. There was also a treatise by Khwáshír ibn Yúsuf ibn Ṣáliḥ al-Arkí who used to navigate in the Arabian Sea in the 11th century.

(Continued)

It is impossible to assume that Sulaymán and other Arab navigators had not had the occasion to meet the Portuguese seamen, who were both bold and clever. In

(*Continued*)

Perhaps the best works on hydrography and navigation in the Oriental Seas during the 14th and 15th centuries are those of an Arab family of navigators who originally belonged to Nejd in Arabia. Muhammad ibn 'Umar and his son Májid wrote a couple of treatises on navigation in the Red Sea and the Arabian Sea. Májid was an expert navigator of these seas and was known as *Rabbān al-barrayn* to the sailors of this part of the world. One of his versified treatises entitled *Ḥijāziyya* (حجازية) contained 1000 couplets. This book is mentioned in subsequent writings.

Májid's son, Aḥmad was one of the greatest navigators of his time. The Lion of the seas, Shiháb al-Dín Aḥmad ibn Májid ibn Muḥammad ibn 'Umar Najdí, the Leader of Nautical Sciences, was well known all over the Eastern Seas, and who, with an experience of 50 years of navigation, composed a treatise named *Al-fawā'id fī uṣūl 'ilm al-baḥr wa 'l-qawā'id* الفوائد فى اصول علم البحر و القواعد in 895 A. H. (1490). This work is commonly known as *Al-Fawā'id.* It contains 12 Chapters. The first six chapters are on astronomy, the seventh on winds, the eighth and the ninth on ship management and the tenth on islands. The eleventh is on monsoons and the twelfth on the Red Sea. Besides this, Aḥmad wrote 25 more books on hydrography and navigation by stars, of which one *Ḥāwiya* is a sort of a summary dealing with various lands, coast lines, islands and the currents of the Indian Ocean, times of tempests (cyclones); routes from Mecca to Jedda, Calicut, Daybul, Konkan, Gujerat, Hurmúz, etc. (all these works 19 in number are contained in MS. No. 2992 of the Bib. Nat. Paris; another 13 of his works are found in MS. 2559 of the same Library). T. A. Shumovsky has established the fact that Aḥmad was the 'Moor' who piloted Vasco de Gama to India.

Another writer of nautical science was Sulaymán ibn Aḥmad al-Mahrí (first half of the 16th century). Thenames of the three treatises are the same as given by Reinaud). The fourth is *Qulādat al-shams fī 'ilm al-tawārīkh* (قلادة الشمس فى علم التواريخ). The best of these is *al-'Umdat al-Mahrīyya* which contains the following chapters:

(1) The principles of nautical astronomy; (2) Names of stars and scales of distances between the North pole and the Pole Star; (3) Sea voyages behind or in front of the wind (from Hejaz to China); (4)

(*Continued*)

1497 and 1498 Vasco de Gama noticed some Arab ships to the north of Mozambique and therein found some compasses and marine charts. Here is what we read in his record of the voyage : the ships of this place were grand; they had a few decks, but they did not have the spikes (or nails); they were stitched with some cords of esparto, and their sails were made of woven palm leaves. The sailors had some compasses for keeping the bearings of the ships. They also had some instruments for observation and a number of marine charts[1]". In one of the ships Vasco de Gama found some Arabic books which he brought to King Emmanuel. In the course of his remarks on his conquests in the Sea of Oman and the Persian Gulf, Albuquerque had also referred to a marine chart which had been constructed by an Arab sailor called 'Umar [2].

In the reign of Sulaymân the Great, there also flourished the Admiral Pírí Reis, author of two books in

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(*Continued*)

Routes *from* Madagascar *to* Formosa; (5) Latitudes of different ports; (6) Western and Eastern monsoon of the Indian Ocean; and (7) Routes from Jedda to Sind.

See G. Ferrand: *Relations des voyages et textes geographiques arabes, persans et turques relatifs a l'Extremé-Orient VIII-e au XVIII-e siecles* vol. II. pp. 484-541, Paris 1914.

T. A. Shumovsky: *Ibn Majid, Vasco de Gama's Pilot.* Geographical Journal of Allunion Geographical Soc. 80, pp. 518-524, Leningrad 1948.

Leo Bagrow: *The Vasco de Gama's Pilot.* Publication Del Civico Instituto Colombiano. Studi Colombiani, vol. III, pp. 105-110, Genova 1951.

Syed Sulayman Nadvi. *'Arabōn kī Jahāz-rānī* (Arab Navigation), Islamic Research Association, Bombay 1935.

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1. *Routier Original,* extract communicated by M. le vicomte de Santarem. I shall refer to this later.

2. See the book called *Commentarios do grande Affonso d'Alboquerque,* Lisbon, 1774, t. 1, pp. 70 and 116.

Turkish entitled *Baḥriyya*[1] or *Maritime Atlas*, one of the Aegean Sea and the other of the Mediterranean Sea. The coasts of both the seas had been visited by the Admiral. These books carefully indicate the currents, the shallow waters, the landing places, the creeks, the gulfs, the straits and the gorges.[2]

The Indian Muslims possessed, in the beginning of the 17th century, a book of reference which is of great interest to the geographer; it is a Persian treatise composed by Abu 'l-Faḍl a minister of the Mughal Emperor Akbar. The book is entitled *Āīn-i Akbarī*[3] or *The Institutes of Akbar*, in accordance with the interest that Akbar took in its composition. The empire founded in India by Babar, one of the descendants of Tamerlane, had expanded under Akbar to wide extents and stretched from Afghanistan up to the Bay of Bengel and from the Himalayas to the Deccan. Thanks to the excellent government established by Akbar, the provinces which had for long been ravaged by intereneoine warfare, came to enjoy [peace and tranquillity. On the other hand the liberal views of the Emperor and his ministers had nothing in common with the spirit of exclusiveness and narrow-mindedness which characterised Islam. They got translated into Persian a number of books of the Sanskrit literature. Abu 'l-Faḍl with the help of a number of scholars ventured to write a geographical, physical and historical description of the empire, accompanied by statistical tables. Each of the 16 *ṣūbas*, which constituted the Mughal Empire is described with minutest exactitude. The relative and geographical situation of the cities and towns is indicated; the enumeration of natural and industrial products is carefully traced; at the same time the nomenclature of

1. بحریة

2. *Historie de l'empire Ottoman*, by M. de Hammer, t. 1 of the French translation, p. XX; t. 6, p. 185; Bio. Bib. Kf. t. 2, p. 22. There is in the Bib. roy. an abridged French translation of these two books by Cardonne in MS. form.

3. آیین اکبری

the princes, Muslims or non-Muslims, who governed these *ṣūbas* before their inclusion in the Empire, is mentioned. One finds in the book an exposition of the military strength of the empire, and an account of the house of the sovereign, etc. The book ends with a précis, prepared in general on the basis of the indigenous sources, on the Brahmanic religion and the different systems of Hindu philosophy, etc.

The author, under the zeal of his erudition, has assumed the style of the ancient Persian authors, which is often difficult to understand. In 1783, Francis Gladwin, at the instance of the Governor General Hastings, published an English version of the book. By virtue of his position and with the help and advice of the indigenous poeple, he got over the difficulties which otherwise would have been insurmountable. The English version was reprinted a number of times and became readily available in India as well as in Europe, and we may be sure that this publication in the beginning was not without influence upon the progress of Indian studies.

Now, if a new edition of Gladwin's version is undertaken, it will prove to be of great value. The book abounds in indigenous names, particularly in Sanskrit words and these words, as they assumed characters of the Arabic alphabet, were subjected to horrible alterations. During the time of Gladwin, Indian studies were not sufficiently advanced to ascertain the correct physiognomy of these words. But now, a scholar of Indian studies, who may possibly be knowing Persian also, may easily re-establish the true form of these terms. On my part, in the course of my works on India, I have made some corrections in the transcription according to my needs.

I should not forget to put in a word about the table of names of places, reproduced in the English version, in Arabic character with their transcription and arranged according to the sequence of the seven climates. Not only

many of the names are altered, but they have also placed in a haphazard way. The confusion becomes al more greater when we do not find them in the ori text. It is evident that the person who, in the begin was put incharge of making this table, knew very of geography.

In the period when *Ā'īn-i Akbarī* was composed Indian writer called Amín Aḥmad and surnamed] for apparently he belonged to the city of Ray, publi in Persian, a large treatise called *Haft Iqlím* or *the i climates*.[1] These climates were described therein one the other, and in each, the author had surveye more or less important cities, with indications of no personages who had been born there, the princes who ruled there, etc. Certain countries are accompanied a historical review. For example, one finds in the a on *Hidustan* a précis on the conquest of the countr the Muslims. Unfortunately, the author lacks schola and reproduces, in general, the writings which were cu in those days. Moreover, he lays much stress on the Each climate is placed under the influence of a parti planet.[2]

One finds in the Bibliothèque royale[3] an Arab port of the Mediterranean Sea, preceded by a wind-rose which I shall speak in the following pages[a], and a of the general map of Idrísí combined with that book called *Crossing of the lands*[4] and having as its au Ibn al-'Aṭṭár. The author of the portolan is 'Al' Aḥmad ibn Muḥammad surnamed al-Sharfí and al-Sif that is to say originating from or inhabitant of in Tunisia. The book carries the date 985 A. H. (

1. هفت اقلیم
2. MS. Persian of the Bibliothéque royale, fond. Brueys N
3. MS. arab. anc. fond no .847.
4. اختراق الاقطار

(a) The second volume of the Translation.

consequently, it was composed in a period when the European ships sailed freely to China and America and when the world had been circumnavigated. But the portolan, which without doubt, was not meant to go out of the Mediterranean Basin, does not give the impression that the new discoveries had been made till that time.

The maps section of the Bibliothèque royale in Paris has recently aquired an Arab map of the ancient world according to Idrísí and Ibn al-'Aṭṭár. This map carries the date 1009 A. H. (1601) and the name of Muḥammad ibn 'Alí ibn Aḥmad, surnamed al-Sharfí and al-Sifàkisí. Evidently, it was made by the son of the above mentioned author. Undoubtedly there was then, a family living on the coast of Africa which for many generations did the business of selling maps to the sailors.

Among the Arabic manuscripts of the Bibliothèque royale, there is a treatise on the use of the quadrant by Aḥmad surnamed al-Sharfí and al-Sifákisí, who wrote the book in Cairo in 1087 A. H. (1676). This person also belonged to the same family.

21

ḤÁJÍ KHALFA

The Turkish literature[a] offers a treatise of general geography called *Jihán-numá* or the *Mirror of the World*,

(a) The oldest known original geographical work in Turkish is the Cosmography *Durr-i Maknún* (در مكنون) by Oghlú Aḥmad. Other works of this kind were the small Cosmography, *Tuḥfat al-Zamán* (تحفة الزمان) by Musṭafá Ibn 'Alí (16th century) and an anonymous *A'lám al-'Ibád* (اعلام العباد). More important is the geographical part of the Cosmographical introduction of the well-known historical work *Kunh al-Akhbār* (كنه الاخبار) by 'Alí (d. 1599). The most important Turkish geographical treatise after the medieval Muslim tradition was composed in 1598 at Damascus by al-'Áshiq under the title: *Manāẓir al-'Ālam* (مناظر العالم). This work besides being a very complete compilation of the ancient geographical material, gives at the same time a great many contemporary facts gathered on extensive journeys. Ḥájí Khalfa's *Jihān-numā* and subsequent treatises of geography and modern atlases (e. g. *Jadīd Atlas terjemesi*, 1803) show European structure—complete with an astronomical introduction on modern lines and the division of the earth according to political and administrative regions.

Turkish travel literature consists of *Mir'at al-Mamālik* of Sīdī 'Alí Re'ís, mentioned by Reinaud in the last Chapter. By far the most important Turkish work of travel is, however, the *Ta'rīkh Sayyāḥ*

(Continued)

and composed by Ḥájí Khalfa the oft-quoted author of a Bibliographical Dictionary in Arabic, Persian and Turkish. The correct name of Ḥájí Khalfa is Muṣṭafá; he took the title of Ḥájí since he had performed the pilgrimage to Mecca, while the word Khalfa is an abbreviated form of the Arabic term *khalífa* or lieutenant which indicates his functions as an assessor in the accounts office at Constantinople. He was born in this city towards the beginning of the 17th century where his father named 'Abdalláh was employed in the department of administration. He entered the Chancellory of the Secretary of State in 1629, and the following year, in this capacity, he accompanied the Ottoman armies in their expeditions directed against the cities of Hamadhán and Baghdad. In 1633 while the troops were stationed at their winter headquarters in Aleppo, he performed his pilgrimage and also visited Medina; then he assisted in the siege of Erivan in 1635. Afterwards, he devoted himself exclusively to writing, and to supplement what he had written earlier,

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(*Continued*)

(تاريخ سياح) by the great traveller Ewelya Celebi. In this he describes his extensive travels made between 1640 and 1672 in all parts of the Ottoman Empire and also in Persia and Europe. This book is unique in its kind and belongs fully to the Muslim travel literature is so far as it does not show any trace of European geographical ideas.

After the works of Ḥájí Khalfa and Ewelya the Islamic tradition dies out in Turkish general geographical literature, but topographical and regional descriptions, likewise of ancient tradition, have continued to be produced until modern times.

J. H. Kramers : *EI*, Suppl. 1938 pp. 71-2.

See also F. Taeschener : Ottoman Turkish geographical literature. (*Zeitschrift der Deutschen Morgenlandischen Gesellschaft, 1923. p. 75*).

J. Germanus: *The Role of the Turks in Islam, Islamic Culture*, Hyderabad (Dn.) Jan., 1934, pp. 1-14.

Ahmad Zaki Walidi : *Islam and the Science of Geography, Islamic Culture*, Hyderabad (Dn.) Oct., 1934, p. 511.

he attended the lectures of the principal professors of the Capital. After having worked for ten years on jurisprudence, logic, rhetoric, the traditions of the prophet and the interpretation of the Qur'án he applied himself to mathematics and geography. We have seen that the author of *Muḥiṭ*, on account of the shortcomings of the Arab and the Persian authors, turned to the Portuguese writers, who could supply the accounts of recently made discoveries. Science had continued to make great progress, and the spirit of enterprise, which also characterized the Ottoman government, did not permit Ḥájí Khalfa to keep aloof from the scientific movement. At that time there was in Constantinople a very learned French renegade who had taken the name of Muḥammad and was surnamed Ikhláṣí.[a] Ḥájí Khalfa contacted this renegade and with his assistance translated into Turkish the little Latin Atlas of Mercator called '*Atlas Minor*', successively improved by Ortelius, Bertius Paul Merula, Daniel Cellarius and, lastly, by Josse Hondius;' Amsterdam, 1607.[1] After becoming invalid, Ḥájí Khalfa took to medicine; but then, goaded by the spirit which so much dominated the activities of his co-religionists, he gave himself up to the cabalistic art and to the science of the name of God. He died in 1658.

Such assiduous and varied studies explain how the author could leave behind works that were both numerous and instructive; above all they account for the mass of facts of all kinds which he has gathered together in his Bibliographical Dictionary, facts which could only be collected in such a city as Constantinople. The books of Ḥájí Khalfa are written in Arabic, Turkish and Persian. Those which interest the geographers are three in number: (1) The translation of the little Atlas of Mercator, namely *Reflections of light serving to elucidate the obscurities of the*

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1. Preface of *Jihán-numá*.

(a) اخلاصی

Atlas minūr[1]; (2) A History of the Maritime wars of the Ottomans, in Turkish, under the title *A present to great men on voyages in the seas*[2]. This history has been printed in Constantinople in 1141 A. H. (1728) in a small volume in 4°. (3) the *Jihān-numā*, a book which deals with Asia, Europe, Africa and America, and for which the author has utilised his two preceding treatises. The original work which was in Arabic is very rare and I have never seen it. The book which has received the widest circulation is the one which includes only Asia, and is in Turkish. It was printed in Constantinople in 1145 A. H. (1732). It has been compiled by the efforts of an Hungarian renegade who had adopted the name Ibrahim for himself. It forms a small volume in fol. of 698 pages. The author has included in the text a great number of passages borrowed from the European books. The text is accompanied by 39 engraved geographical maps. In the beginning are the prefaces wherein he has dealt with the celestial sphere, the terrestrial globe, etc. The part which is of greatest interest to us is that which is borrowed from oriental treatises indicated in the preface and some of which are not found in our libraries. In fact the author should have added here the political and statistical information which he could collect by virtue of his position. The impression of the second volume, which was devoted to Europe, Africa and America, suffered some set-backs; in the meantime, the world suffered changes wrought by the time, and consequently the publication of the rest was given up. In 1219 A. H. (1804) the government published a Turkish translation of the English Atlas of geography by Faden, with explanations in Turkish. M. de Hammer published in Vienna in 1812, a German version of the chapter of *Jihān-numā* which deals with Turkey in Europe, under the title *Rumili-und Bosna* in 8°. As regards the volume which is devoted

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1. لوامع النور فى ظلمة اطلس مينور
2. تحفة الكبار فى اسفار البحار

to Asia, there is a French translation in MS. form at the Bibliothèque royale, by Armain, secretary—interpreter of the King. Armain omitted a part of the prefatory matter as well as the chapters on Japan and Malaya, which were based on European treatises. The famous d'Anville has often made use of this translation and M. Vivien de Saint-Martin has published the chapter on Anatolia, in the second volume of his excellent book called *Histoire des découvertes géographiques des nations européennes, dans les diverses parties du monde.* The intention of M. Vivien is to insert successively the other chapters in the subsequent volume. There has also appeared a Latin version abridged from the Turkish volume, done by Norberg under the title *Gihan-numa, geographia orientalis*, Lund 1818, 2 vols. in 8°. This translation in the opinion of M. de Hammer, lacks exactitude.

I shall stop here, since, on no occasion, in my work, have I utilised more recent works than these.[1] A similar plan like the one I have adopted was undertaken by the illustrious M. Fraehn[2] in 1823, and by the savant M. Wüstenfeld[3] in 1835. Persons who like to know what further work has been done since these times, and what helps have been rendered to me on account of my personal position in the Department of Oriental MSS. of the Royal Library of Paris, shall have to do a simple work of comparison. I may now pass on to the question of doctrines, a question which is even more important than the one which we have been dealing with.[a]

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1. Excepting Ṣádiq Isfahání, Persian author of the 17th century, whose writings contained little of geographical value. I shall say a few words about him in the next (volume).

2. *Ibn-Fozlan's und anderer Araber Berichte;* in-4°.

3. *Abulfedae tabulae quaedam geographicae* Gottingue, in-8°.

(a) In the 2nd volume of this work.

ABBREVIATIONS

As. Soc. Bengal	Asiatic Society of Bengal, Calcutta.
B. A. H. U. G.	Bibliothek Arabischer Historiker und Geographen.
B. G. A.	Bibliotheca Geographorum Arabicorum ed. M. J. de Goeje, Leiden 1870-94.
BGN	Beiträge zu Geschichte der Naturwissenschaften, E. Weidemann, I-LXX, 1903-28.
Bib. Nat.	Bibliothèque Nationale, Paris.
Bib. roy.	Bibliothèque royale, Paris.
C–A.	*Chronique d'Aboulfeda,* J. J. Reiske and J. G. C. Adler, *Annales Muslemici Arabice et latine,* 5 vols., Copenhagen 1789–94.
Dic. Bib. Kf.	Haji Khalfa, *Kashf al-Zunun,* ed. Flügel, Leipzig 1835–58.
Dic. Kn./Dic. Ibn Kh.	Ibn Khallikan, *Wafiyat al-A'yan,* ed. MacGuckin de Slane, 4 vols. Paris 1842–71.
EI	*Encyclopaedia of Islam,* 1st ed.
G–A.	*Geographie d'Aboulfeda,* M. Reinaud, 2 vols. Paris 1848.
Ges. ar. Lit.	*Geschichte der arabischen Litteratur,* C. Brockelmann, Weimer and Berlin 1898–1902.
Ges. ar. Nat.	*Geschichte der arabischen Aertze und Naturforscher,* F. Wüstenfeld, Göttingen 1840.
Ges. Ar. Wer.	*Geschichschreiber der Araber und ihre Werke,* Abhand der Akad. der Wiss zu Göttingen 1881, 1882.
GMS	Gibb Memorial Series.
Hudud	*Hudud al-'Alam,* tr. and commentary by V. Minorsky, (GMS, NS XI) London 1937.

IH/I. H. S.	*Introduction to the History of Science,* G. Sarton, vols. 1–3, Baltimore 1927–31.
'Ilm. Nallino	C. A. Nallino, *'Ilm al-Falak wa Ta'rikhuhu 'ind al-'Arab fi 'l-Qurun al-Wusta,* Rome 1911–12.
Isl. Cult.	*Islamic Culture,* Hyderabad (Dn.).
K. T.	*Kitab al-Tanbih* (MS. Bib. roy.).
MA	Konrad Miller, *Mappae Arabicae,* Stuttgart 1926–31.
Math. Ast. Ar.	H. Suter, *Die Mathematiker und Astronomen der Araber und ihre Werke,* Leipzig 1900.
M. DH.	*Muruj al-Dhahab* (MS. No. 714, Suppl. arab. Bib. roy.).
Memoirs on India	M. Reinaud, Memoirs on India, see *Memoires de l'Academie des inscriptions,* vol. XVII, Part 2.
Muruj	*Muruj al-Dhahab,* ed. C. Barbier de Meynard et Pavet de Courteille, Paris 1861-77.
Notices	*Notices de la Bibliotheque royale.*
Not. Ext., Bib. roy.	*Notices et Extraits des manuscrits de la Bibliotheque royale.*
R. V.	*Relation des voyages faits par les Arabes et les Persans, dans l'Inde et a la Chine,* etc. ed. and tr. Langlès and Reinaud, 2 vols., Paris 1845.

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15	20-21	observaitons	observations
17	1n.	*al-Ḥukamás*	*al-Ḥukamá*
18	2	hs	us
18	1n.	the at Paris, there Mazarine Library	the Mazarine Library at Paris, there
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24	15n.	al-Matawakkil	al-Mutawakkil
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194	13	Delete 'of'	
200	16	Bengel	Bengal
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205	6n.	is	in
224	31	*Kiiab*	*Kitab*